INSTRUCTION BOOK

FOR

RADIO TRANSMITTER BC-375-C
AND
ASSOCIATED EQUIPMENT

MANUFACTURED BY

GENERAL ELECTRIC COMPANY
U.S.A.

RESTRICTED

PUBLISHED BY AUTHORITY
OF
THE CHIEF SIGNAL OFFICER

ORDER NO. 51-NY-40

DATE 8-3-39

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ORDER NO. 51-NY-40
2-41 (1620)

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(GEI-12358A)

SAFETY TO HUMAN LIFE

OPERATION OF THIS EQUIPMENT INVOLVES THE USE OF HIGH VOLTAGES WHICH ARE DANGEROUS TO LIFE. OPERATING PERSONNEL MUST AT ALL TIMES OBSERVE ALL SAFETY REGULATIONS. DO NOT CHANGE TUBES OR MAKE ADJUSTMENTS INSIDE EQUIPMENT WITH HIGH-VOLTAGE SUPPLY ON. DO NOT COMPLETE OR MAINTAIN ANY CONNECTION BETWEEN TRANSMITTER AND DYNAMOTOR UNIT UNLESS ALL UNUSED SOCKETS ON THE TRANSMITTER ARE COVERED BY SOCKET CAPS WITH CATCHES PROPERLY SNAPPED IN PLACE.

KEEP AWAY FROM LIVE CIRCUITS

1. Under no circumstances should any person be permitted to operate the dynamotor with relay-fuse box cover or end bells removed; or to replace fuses with power on; or to remove, place, or handle removed plugs with the dynamotor running.
2. Under no circumstances adjust circuits or service the equipment when the carrier is keyed off only. The transmitter uses a grid-bias keying circuit, which does not remove high voltage when the key is open.

DO NOT OPERATE THE EQUIPMENT WITH SHIELDS REMOVED

TABLE OF CONTENTS

Page

I. DESCRIPTION OF COMPLETE EQUIPMENT

GENERAL 1
ANTENNA TUNING UNIT BC-306-A 1
CASE CS-48 2
DYNAMOTOR UNIT PE-73-B 3
RADIO TRANSMITTER BC-375-C 4
TRANSMITTER TUNING UNITS TU-5-A, ETC. 5
CO-ORDINATION OF UNITS 5
AIRCRAFT RADIO SETS 5
LIST OF MAIN UNITS 6

II. EMPLOYMENT

INSTALLATION 7
- Radio Transmitter BC-375-C 7
- Dynamotor Unit PE-73-B 7
- Cords 7
- Antennas 7
- Antenna Tuning Unit BC-306-A 8
- Reel RL-30-B and Connector Clamp MC-163 8
- Interconnection with Radio Receiver in Aircraft 9

PREPARATION FOR USE 9
- Radio Transmitter BC-375-C 9
- Dynamotor Unit PE-73-B 11

OPERATION 11
- Operation at High Altitude 11
- Transmitter Adjustment 11
- Antenna Circuits 13
- Dynamotor Unit PE-73-B 15
- Reel RL-30-B 15
- Operating Routine 16

SUMMARY COVERING NORMAL OPERATIONS 16

III. DETAILED FUNCTIONING OF PARTS

RADIO TRANSMITTER BC-375-C 18
VACUUM TUBES 23
TRANSMITTER TUNING UNITS 24
ANTENNA TUNING UNIT BC-306-A 25
DYNAMOTOR UNIT PE-73-B 25

IV. MAINTENANCE

INSPECTION 26
LUBRICATION 27
SERVICE NOTES 28

V. SUPPLEMENTARY DATA AND LIST OF REPLACEABLE PARTS

TABLE OF REPLACEABLE PARTS 37
TABLE OF INTERCHANGEABLE PARTS 47
RENEWAL PARTS 48

LIST OF ILLUSTRATIONS

Page

Fig. 1. Radio Transmitter BC-375-C and Associated Equipment viii
Fig. 2. Antenna Tuning Unit BC-306-A 1
Fig. 3. Case CS-48 and Rear View of a Transmitter Tuning Unit 2
Fig. 4. Dynamotor Unit PE-73-B 3
Fig. 5. Radio Transmitter BC-375-C, with Transmitter Tuning Unit TU-22-A in Place 4
Fig. 6. Typical Front View of a Transmitter Tuning Unit without a Band Change Switch 5
Fig. 7. Mounting FT-115-B 7
Fig. 8. Radio Transmitter BC-375-C, with Tube Compartment Shield Removed and Transmitter Tuning Unit TU-22-A Being Inserted 9
Fig. 9. Radio Transmitter BC-375-C, Filament Resistor and Terminal Board 10
Fig. 10. Antenna Reactance Curve 13
Fig. 11. Radio Transmitter BC-375-C, Functional Diagram of Radio-Frequency and High-Voltage Circuits 18
Fig. 12. Radio Transmitter BC-375-C, Functional Diagram of Antenna Tuning Circuits 19
Fig. 13. Radio Transmitter BC-375-C, Functional Diagram of Audio-Frequency Circuits—Tone Operation 20
Fig. 14. Radio Transmitter BC-375-C, Functional Diagram of Audio-Frequency Circuits—CW Operation (Side Tone) 20
Fig. 15. Radio Transmitter BC-375-C, Functional Diagram of Audio-Frequency Circuits—Voice Operation 21
Fig. 16. Radio Transmitter BC-375-C, Functional Diagram of Low-Voltage and Control Circuits 22
Fig. 17. Tube VT-4-C, Characteristic Curves 23
Fig. 18. Tube VT-25, Characteristic Curves 24
Fig. 19. Antenna Tuning Unit BC-306-A, Schematic Diagram 25
Fig. 20. Dynamotor Unit PE-73-B, Schematic Diagram 25
Fig. 21. Antenna Tuning Unit BC-306-A, Interior View 51
Fig. 22. Dynamotor Unit PE-73-B; Mounting FT-107 and Low-Voltage End Bell Removed 52
Fig. 23. Dynamotor Unit PE-73-B; Mounting FT-107 and High-Voltage End Bell Removed 53
Fig. 24. Dynamotor Unit PE-73-B, Top View; with Mounting FT-107 and Relay-Fuse Box Cover Removed 54
Fig. 25. Radio Transmitter BC-375-C, Tube Compartment Shield and Top Cover Off and Transmitter Tuning Unit in Place 55
Fig. 26. Radio Transmitter BC-375-C, Rear View; Mounting FT-151-A and Shields Removed 56
Fig. 27. Radio Transmitter BC-375-C, Rear View; Mounting FT-151-A and Shields Removed 57
Fig. 28. Radio Transmitter BC-375-C, Bottom View; Mounting FT-151-A and Shields Removed 58
Fig. 29. Transmitter Tuning Unit TU-5-A, Top View, Cover Removed 59
Fig. 30. Transmitter Tuning Unit TU-5-A, Bottom View, Cover Removed 59
Fig. 31. Transmitter Tuning Unit TU-6-A, Top View, Cover Removed 60
Fig. 32. Transmitter Tuning Unit TU-6-A, Bottom View, Cover Removed 60
Fig. 33. Transmitter Tuning Unit TU 7-A, Top View, Cover Removed 61
Fig. 34. Transmitter Tuning Unit TU-7-A, Bottom View, Cover Removed 61
Fig. 35. Transmitter Tuning Unit TU-8-A, Top View, Cover Removed 62
Fig. 36. Transmitter Tuning Unit TU-8-A, Bottom View, Cover Removed 62
Fig. 37. Transmitter Tuning Unit TU-9-A, Top View, Cover Removed 63
Fig. 38. Transmitter Tuning Unit TU-9-A, Bottom View, Cover Removed 63
Fig. 39. Transmitter Tuning Unit TU-10-A, Top View, Cover Removed 64
Fig. 40. Transmitter Tuning Unit TU-10-A, Bottom View, Cover Removed 64
Fig. 41. Transmitter Tuning Unit TU-22-A, Top View, Cover Removed 65
Fig. 42. Transmitter Tuning Unit TU-22-A, Bottom View, Cover Removed 65
Fig. 43. Antenna Tuning Unit BC-306-A, Connection Diagram 67
Fig. 44. Antenna Tuning Unit BC-306-A, Dimensions and Weight 68
Fig. 45. Case CS-48, Dimensions and Weight 69
Fig. 46. Dynamotor Unit PE-73-B, Connection Diagram 70

LIST OF ILLUSTRATIONS (Cont'd)

Page

Fig. 47. Dynamotor Unit PE-73-B, Dimensions and Weight........ 71
Fig. 48. Mounting FT-115-B, Dimensions and Weight........ 72
Fig. 49. Radio Transmitter BC-375-C, Schematic Diagram........ 73
Fig. 50. Radio Transmitter BC-375-C, Connection Diagram........ 74
Fig. 51. Radio Transmitter BC-375-C, Dimensions and Weight........ 75
Fig. 52. Transmitter Tuning Units, Schematic Diagram........ 76
Fig. 53. Transmitter Tuning Unit TU-5-A, Connection Diagram........ 77
Fig. 54. Transmitter Tuning Unit TU-6-A, Connection Diagram........ 78
Fig. 55. Transmitter Tuning Unit TU-7-A, Connection Diagram........ 79
Fig. 56. Transmitter Tuning Unit TU-8-A, Connection Diagram........ 80
Fig. 57. Transmitter Tuning Unit TU-9-A, Connection Diagram........ 81
Fig. 58. Transmitter Tuning Unit TU-10-A, Connection Diagram........ 82
Fig. 59. Transmitter Tuning Unit TU-22-A, Connection Diagram........ 83
Fig. 60. Radio Set SCR-287-A, Cording Diagram........ 84

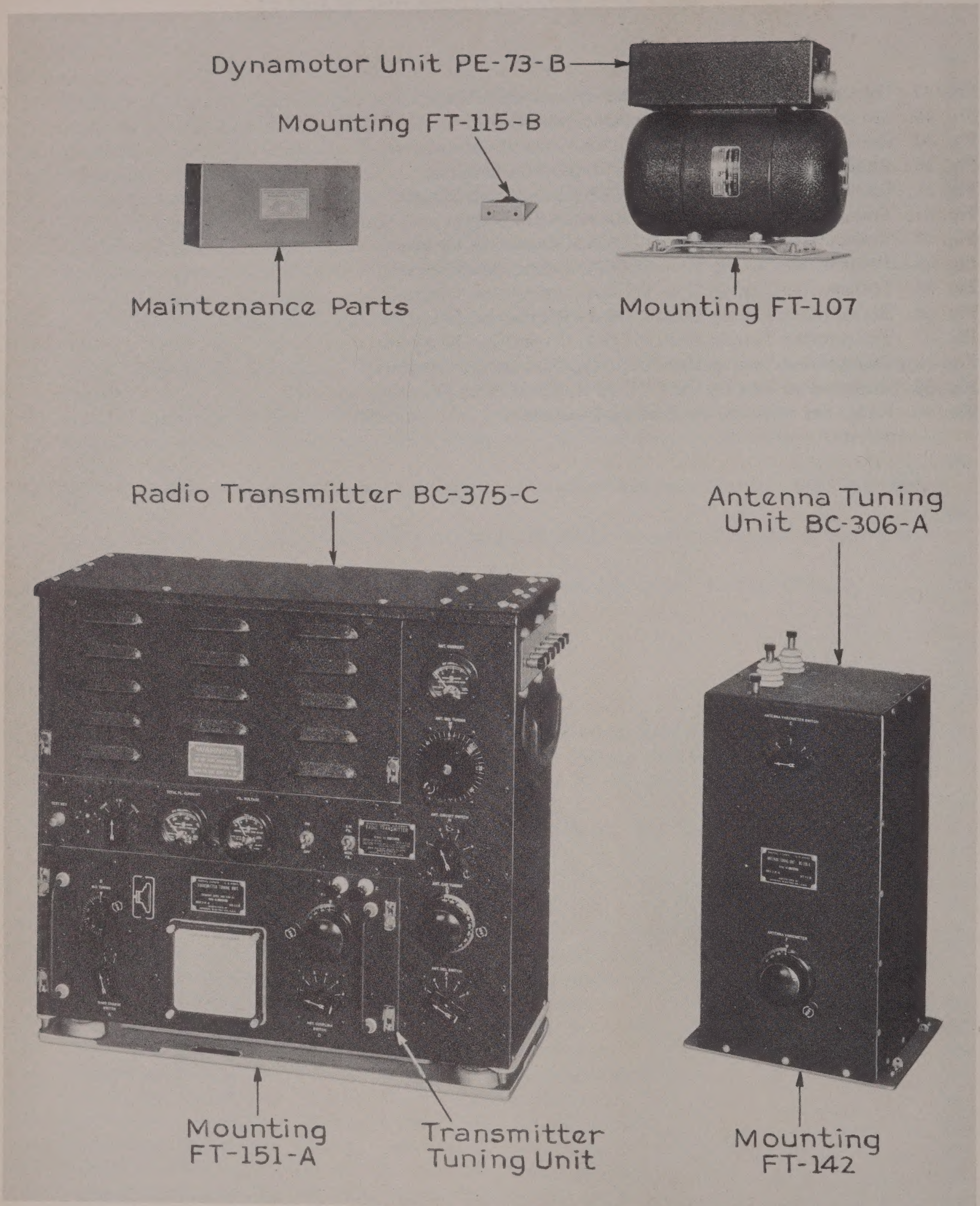

Dynamotor Unit PE-73-B
Mounting FT-115-B
Maintenance Parts
Mounting FT-107
Radio Transmitter BC-375-C
Antenna Tuning Unit BC-306-A
Mounting FT-151-A
Transmitter Tuning Unit
Mounting FT-142

Fig. 1. Radio Transmitter BC-375-C and Associated Equipment

I. DESCRIPTION OF COMPLETE EQUIPMENT

GENERAL

1. Radio Transmitter BC-375-C with its associated equipment is designed for aircraft and other applications requiring a medium power equipment with the characteristics of strength, light weight, flexibility, and portability. The equipment is designed to provide communication by voice, tone, or continuous-wave telegraphy over the frequency range of 150 to 12,500 kilocycles. However, only the frequencies covered by the Transmitter Tuning Units listed in paragraph 15 are available for use with this equipment. Suitable tuning equipment is provided in the radio transmitter to permit operation into a wide range of antennas over most of the frequency range. Antenna Tuning Unit BC-306-A may be used to extend the range of antenna tuning for frequencies between 150 and 800 kilocycles.

2. Dynamotor Unit PE-73-B furnishes the power required by the radio transmitter and operates from a 24/28 volt storage battery or other direct-current source used in aircraft. The input power when operating on continuous-wave telegraph will be approximately 600 watts. The fully modulated voice transmission will require 840 watts input power.

3. Because of the flexibility with which it can be adapted to fit different requirements and conditions of operation, Radio Transmitter BC-375-C may be used as an item of a number of different radio sets. The other items, such as tuning units, cords, etc., will be listed in the "Parts List" of each set.

ANTENNA TUNING UNIT BC-306-A (INCLUDES MOUNTING FT-142)

4. This unit consists of a painted duralumin case which houses a variometer 1502, control F; and a switch 1501, control E. Sufficient inductive reactance is provided in this unit, in addition to the reactance provided in the transmitter and transmitter tuning

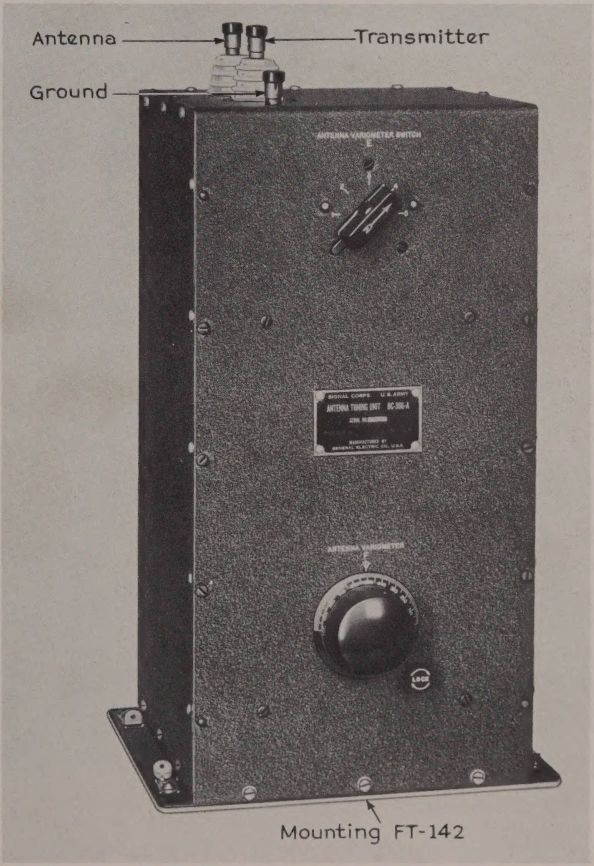

Antenna
Transmitter
Ground
ANTENNA VARIOMETER SWITCH
E
SIGNAL CORPS U.S. ARMY
ANTENNA TUNING UNIT BC-306-A
MANUFACTURED BY GENERAL ELECTRIC CO. U.S.A.
ANTENNA VARIOMETER
F
LOCK
Mounting FT-142

FIG. 2. ANTENNA TUNING UNIT BC-306-A

units, to resonate antennas whose effective capacitance varies as indicated below:

Frequency Range	**Effective Capacitance Range**
150–350 kc	1000–1500 mmfds.
350–800 kc	350–800 mmfds.

5. The controls permit a continuous variation of the inductive reactance. Suitably insulated binding posts are located on the top shield. Four snap-slide catches are used to attach the unit to Mounting FT-142.

6. The terminals at the top of the antenna tuning unit are for interconnection between the "loading" terminals of the radio transmitter when operating on frequencies above 400 kilocycles. For operation on frequencies below 400 kilocycles, the antenna tuning unit is connected in the antenna circuit and the two "loading" terminals are connected together as described in section II, EMPLOYMENT.

CASE CS-48

7. This case consists of an individual metal container into which any one of the transmitter tuning units may be inserted and mounted or carried. The tuning unit is secured in the case by the same four snap-slide catches that are used to secure the unit in the radio transmitter.

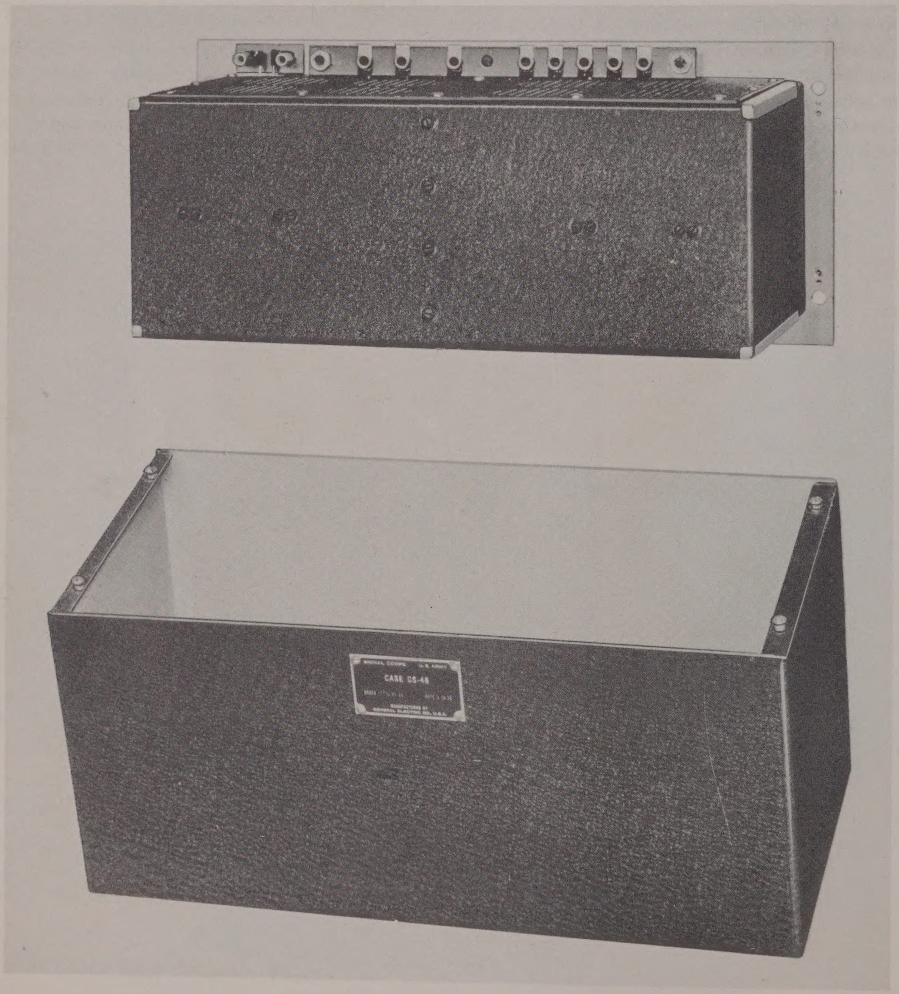


FIG. 3. CASE CS-48 AND REAR VIEW OF A TRANSMITTER TUNING UNIT

DYNAMOTOR UNIT PE-73-B (INCLUDES MOUNTING FT-107)

8. Dynamotor Unit PE-73-B consists of a dynamotor upon which is mounted a box containing the relay, fuses, sockets, capacitor, etc. The dynamotor proper is a two-pole, totally-enclosed, ball-bearing, d-c to d-c rotating machine. It is rated at 28 volts, 20 amperes input; 1000 volts, 0.35 amperes output, at 5000 rpm, with 55 deg. Centigrade rise for ½ hour intermittent duty. It has been designed to give efficient, reliable service over long periods of time with a minimum of attention. Skeleton type bearing brackets on each end afford maximum accessibility of the commutators and brushes. The portion of the armature winding between each commutator and armature core is securely bound with cord and thoroughly impregnated, thus affording a mechanical protection for the armature winding against injury from moisture, dirt, and abrasion. The external leads of the dynamotor go directly into the relay-fuse box through two bushings in the top of the magnet frame.

9. A totally-enclosed, solenoid-type starting relay, particularly designed to withstand vibration, sudden shock and acceleration as encountered in aircraft installation is used. The double-break contacts are sufficiently large to carry the heavy starting current of the dynamotor.

10. The input binding posts and fuse clips are mounted on and securely pinned to a molded terminal board. In addition, all fuse clips and terminals are soldered to their mounting screws so as to insure a tight, low resistance, electrical contact.

11. Four snap-slide catches are employed to fasten the cover to the relay-fuse box. A spare H.V. fuse, spare fuse links, and a socket wrench are carried in clips inside of this cover. In one end of the relay-fuse box are mounted the Sockets SO-39 and SO-41. A 15/16 in. diameter hole for entrance of a conduit containing the two power-input leads is provided between these sockets.

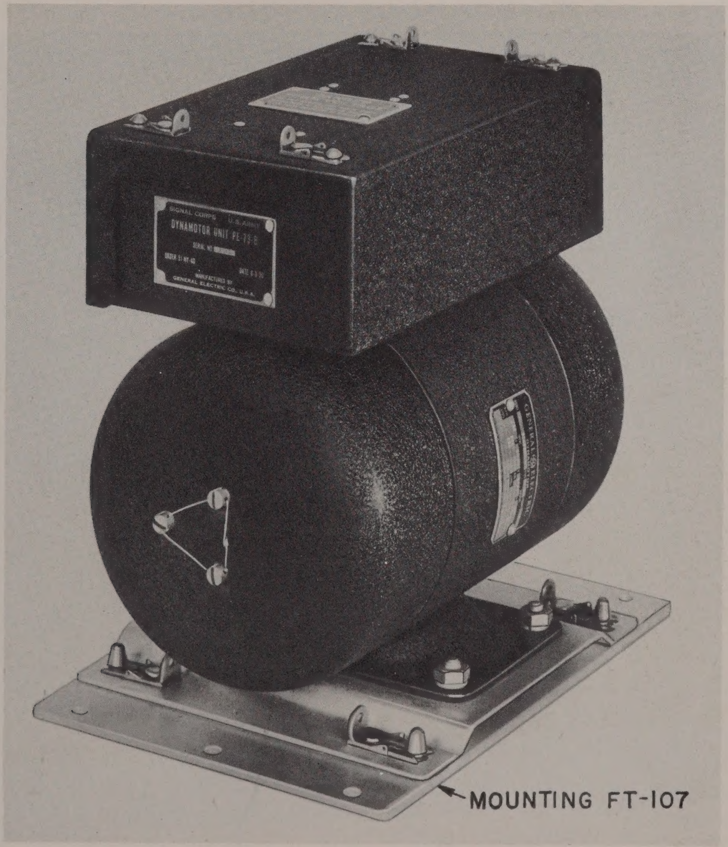


Fig. 4. Dynamotor Unit PE-73-B

RADIO TRANSMITTER BC-375-C (INCLUDES MOUNTING FT-151-A)

12. Radio Transmitter BC-375-C consists of a shielded metal cabinet containing the necessary vacuum tubes, sockets, antenna tuning equipment, audio-frequency circuits, input and output terminals and plug connectors for connection to the radio-frequency circuits contained in the transmitter tuning units. The circuits of this unit are shown in Fig. 49, and its external dimensions are shown in Fig. 51.

13. The radio transmitter frame is constructed of seamless chrome-molybdenum steel tubing. Shields are attached to this frame by means of button-head machine screws in all cases except the front tube compartment shield which is fastened by means of snap catches. Vacuum tubes are mounted in the upper front portion of the frame and are readily accessible by removal of the aforementioned tube compartment shield. The right-hand side of the frame includes the antenna tuning equipment. The test key, signal switch, filament voltage, and plate current meters, indicator lamp, on-off switch and voltmeter switch are mounted on a narrow panel below the tube compartment. Access to the calibration reset capacitor is gained through a small port in this panel. The bottom front portion of the radio transmitter is provided with accurately fitted guides to receive the transmitter tuning units which are slid into place so that the tuning unit panel forms the bottom front portion of the radio transmitter panel. Sockets and a jack for external power and control circuit connections are provided on the left-hand side of the radio transmitter.

14. The transmitter uses five vacuum tubes as follows:

1 Tube VT-4-C as master oscillator
1 Tube VT-4-C as power amplifier
2 Tubes VT-4-C as class B modulators
1 Tube VT-25 as speech amplifier or audio-frequency oscillator

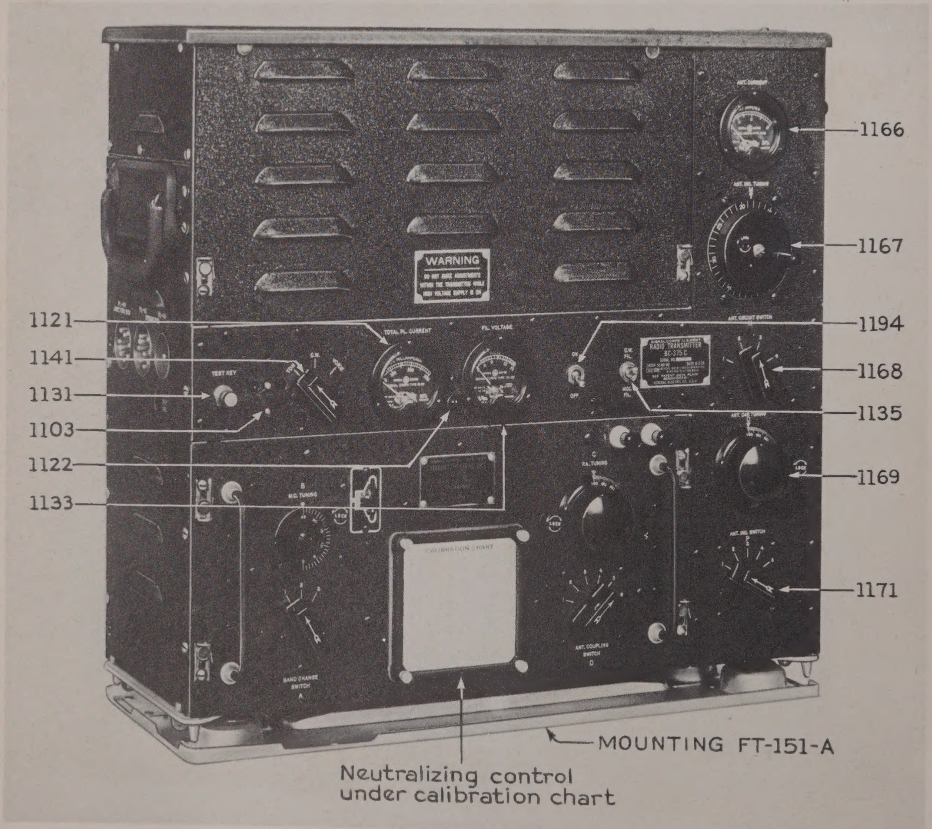


FIG. 5. RADIO TRANSMITTER BC-375-C, WITH TRANSMITTER TUNING UNIT TU-22-A IN PLACE

15. There are seven transmitter tuning units covering the frequency range of 350 to 650 and 1500 to 12,500 kilocycles, as listed below.

1.	TU-5-A	1500-3000 kc
2.	TU-6-A	3000-4500 kc
3.	TU-7-A	4500-6200 kc
4.	TU-8-A	6200-7700 kc
5.	TU-9-A	7700-10,000 kc
6.	TU-10-A	10,000-12,500 kc
7.	TU-22-A	350-650 kc

16. Each of these units consists of a duralumin case in which are housed the radio-frequency circuits for the master oscillator and power amplifier. The unit is plugged into the radio transmitter, its front panel forming a part of the radio transmitter front panel. The circuits of all transmitter tuning units are shown in Fig. 52. The tuning unit panel contains the following controls: band-change switch, Control A (used only when tuning controls do not cover the complete frequency range); master-oscillator tuning, Control B; power-amplifier tuning, control C; antenna coupling switch, control D and neutralizing capacitor control. Since the neutralizing capacitor does not require adjustment in service, it is made accessible only by removal of the tuning chart which is mounted on the front panel.

CO-ORDINATION OF UNITS

17. The various units previously described, when connected together by their respective cords, comprise the transmitting equipment of a radio set. The following additional items are necessary to make a complete operative installation.

a. Radio receiving equipment including headsets

b. Suitable antenna system

c. Microphone T-17, or equivalent

d. Hand telegraph key

e. Primary power source

f. Plugs and cordage

AIRCRAFT RADIO SETS

18. In aircraft radio sets, the receiving equipment is interconnected with the transmitting equipment so that they are co-ordinated for break-in operation. The receiver can be operated when the radio transmitter is either "OFF" or "ON" provided that neither the telegraph key nor the microphone switch is depressed. It is impossible for the radio transmitter and radio receiver to be operative at the same time, that is, the keying relay in the radio transmitter, when it causes the radio transmitter to function, at the same time open-circuits the receiver plate or screen-grid supply and only transmitter side tone is heard in the headset. When the keying relay opens, radio transmitter output ceases and the receiver plate or screen-grid supply is restored. The radio transmitter is made ready for operation by its OFF-ON switch and transmission is controlled by the telegraph key or the microphone switch.

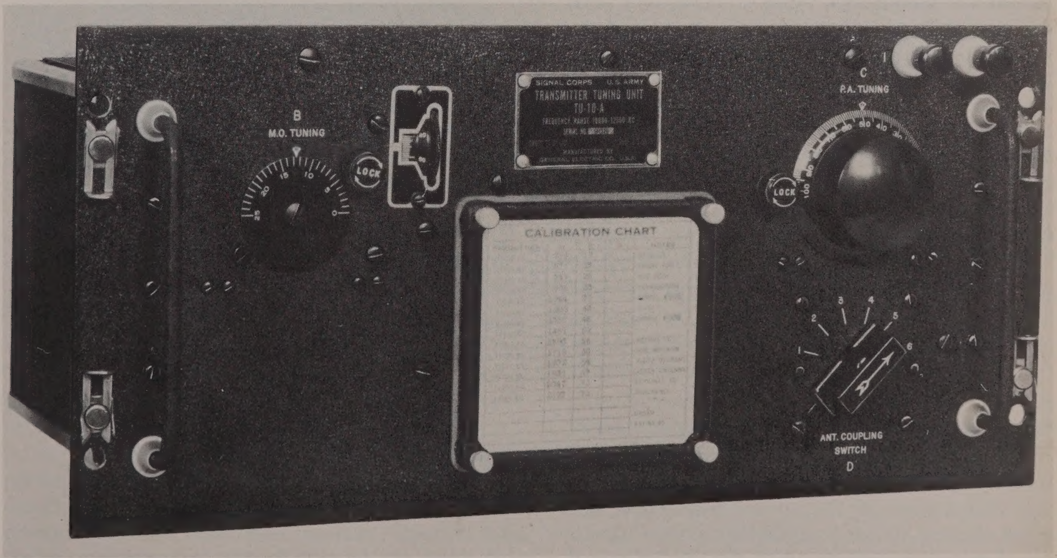


Fig. 6. Typical Front View of a Transmitter Tuning Unit without a Band Change Switch

LIST OF MAIN UNITS

19. The following tabulation gives the sizes and weights of the main units.

Description	Dimensions in Inches H x W x D	Wt. in Lbs
Antenna Tuning Unit BC-306-A	17¾ x 9½ x 9⅛	9.75
Weight less Mounting FT-142		9.062
Case CS-48	7⅞ x 16¾ x $7\frac{29}{32}$	4.375
Dynamotor Unit PE-73-B	$10\frac{29}{32}$ x $11\frac{1}{16}$ x 7½	39.20
Weight less Mounting FT-107		37.75
Mounting FT-107	$\frac{13}{16}$ x 10⅝ x 7½	1.45
Mounting FT-115-B	$1\frac{7}{32}$ x 2⅛ x $2\frac{5}{16}$	0.195
Mounting FT-142	$\frac{13}{32}$ x 9½ x 8	0.69
Mounting FT-151-A	1.352 x 22 x 8	3.75
Radio Transmitter BC-375-C (without tubes or tuning units)	$21\frac{21}{32}$ x 23⅛ x $9\frac{5}{16}$	52.75
Weight less Mounting FT-151-A		49.0
Transmitter Tuning Unit TU-5-A	7⅝ x 16¾ x 8¾	14.437
Transmitter Tuning Unit TU-6-A	7⅝ x 16¾ x 8¾	12.437
Transmitter Tuning Unit TU-7-A	7⅝ x 16¾ x 8¾	11.687
Transmitter Tuning Unit TU-8-A	7⅝ x 16¾ x 8¾	11.437
Transmitter Tuning Unit TU-9-A	7⅝ x 16¾ x 8¾	11.437
Transmitter Tuning Unit TU-10-A	7⅝ x 16¾ x 8¾	11.437
Transmitter Tuning Unit TU-22-A	7⅝ x 16¾ x 8¾	12.250
Tube VT-4-C	$2\frac{5}{16}$ dia. x 7⅞ long	0.46
Tube VT-25	$2\frac{3}{16}$ dia. x 5⅝ long	0.125
1 Carton of Maintenance Parts. This carton contains: 4—Dynamotor H.V. Brushes BR-5 4—Dynamotor L.V. Brushes BR-6 2—Fuses FU-12-A 2—Fuses FU-13 2—Fuses FU-18-A 2—Fuses FU-22 6—Fuse Links M-141 6—Fuse Links M-168 4—Set Screw Wrenches ¼ Pt. of Glyptal Varnish No. 1153	2¾ x 3⅞ x 7 ⅞	1.75

II. EMPLOYMENT

INSTALLATION

20. Radio Transmitter BC-375-C and associated equipment are part of aircraft radio sets. Installation conditions vary widely and no detailed single set of installation instructions can be given in this book. However, separate instructions are furnished for each radio set and only such general instructions as should be followed in all installations are given in the following paragraphs.

21. The requirements for shielding and bonding of cords in aircraft installations are very rigid, in order that difficulties with the receiver side-tone pick-up and radio frequency from the power supply will be minimized.

Radio Transmitter BC-375-C

22. The transmitter outline dimensions and weights are shown in Fig. 51.

23. The transmitter should be located in relation to its associated equipment so that dynamotor and antenna leads will be of minimum length. Two types of shock-absorber mountings are available for use with the radio transmitter: Mounting FT-151-A, tray-type; and Mounting FT-115-B, disposable-type. The tray-type mounting, to which the radio transmitter is attached by four snap-slide catches, is used to support the transmitter with one or more of the disposable mountings added near the top of the radio transmitter to prevent swaying. Mounting FT-115-B consists of a rubber button in a steel shell which may be attached to the top, bottom, or sides of the radio transmitter. Certain transmitter-cover fastening screws have been placed so as to allow attachment of this mounting.

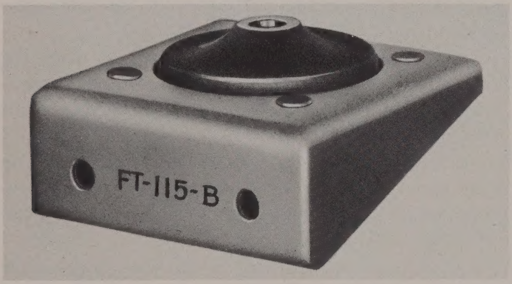


FIG. 7. MOUNTING FT-115-B

24. The radio transmitter should not be mounted closer than two inches from a wall. The power cords should not be fastened nearer than 12 inches from the transmitter. This precaution prevents vibration from being transmitted to the unit through the cords. It is important that sufficient space be allowed in the front of the radio transmitter to facilitate replacement of tubes, removal of transmitter tuning units, and the making of tuning adjustments. After installation has been completed and tested, the snap-slide catches should be securely safety-wired at the places provided.

Dynamotor Unit PE-73-B

25. Outline dimensions and weight are shown in Fig. 47. The dynamotor unit should be mounted in an accessible position to allow access to the relay-fuse box, keeping in mind that the length of the leads from the battery to the dynamotor unit must be as short as practicable. This unit when operated in conjunction with Radio Transmitter BC-375-C draws from 20 to 30 amperes. No. 6 AWG or larger conductor should therefore be used for these leads in order to keep the voltage drop at a minimum. Mounting FT-107 should be securely attached so that the dynamotor unit cannot be torn loose by acceleration, vibration, or shock.

26. After the dynamotor unit is clamped securely to Mounting FT-107 by means of the four snap-slide catches, Plugs PL-59 and PL-61 of the applicable cords should be plugged into Sockets SO-39 and SO-41, respectively, on the dynamotor unit. The primary leads from the battery or junction box should then be clamped securely to the proper binding posts on the dynamotor unit terminal board.

Cords

27. The cords or plugs and cordage to be used with the various radio sets are listed in the Parts Lists for same. A typical cording arrangement of an aircraft radio set is shown in Fig. 60.

Antennas

28. Because of the wide variety of antennas in the radio sets of which Radio Transmitter BC-375-C is a part, no specific details will be given for antenna installations. However, the following general precautions should be observed:

a. The antenna and ground leads should be made as short as possible, except where the length of lead-in is definitely determined by the placement of radio set and antenna.

b. Antenna leads should be insulated to withstand radio-frequency potentials as high as 5000 volts.

c. Antenna leads should be so placed that operating personnel will not come in contact with them during normal operation of the equipment. Points accessible to personnel should be covered with Isolantite beads.

d. Ground connections should have as low resistance as possible. In aircraft installations the ground path should be well bonded. The "GND" post should always be connected to the ground system by a short lead, allowing, of course, for flexure due to vibration and shock. A link will be required between posts "LOADING A" and "LOADING B" when Antenna Tuning Unit BC-306-A is not used. This antenna tuning unit is not recommended when frequencies above 800 kilocycles are used.

e. Antenna leads between the antenna and the radio transmitter and between the radio transmitter and the receiver should be located as far as possible from any primary wiring of the airplane. This applies especially to the wiring to the dynamotor unit and is necessary in order to decrease the pickup of electrical interference by the antenna circuit wiring.

Antenna Tuning Unit BC-306-A

29. This tuning unit is provided with Mounting FT-142. It should be mounted so that the tuning controls will be accessible during operation. It is desirable that the length of leads between the radio transmitter and the antenna tuning unit be kept to a minimum and that the leads be well insulated. Outline dimensions and weight are shown in Fig. 44.

30. For operation on frequencies above 400 kilocycles, terminals "A—TRANS." and "B—ANT." on the antenna tuning unit are connected to LOADING TERMINALS "A" and "B" respectively on the radio transmitter. For operation on frequencies below 400 kilocycles, a jumper is placed across LOADING TERMINALS "A" and "B" on the radio transmitter. Terminal "A—TRANS." on the antenna tuning unit is then connected to the antenna post, marked "ANT," on the radio transmitter while the antenna connection is made to terminal "B—ANT." The post marked "GND" on the antenna tuning unit should always be connected to the radio transmitter ground.

Reel RL-30-B and Connector Clamp MC-163

31. The reel should be mounted in such a position that the crank is readily accessible and the counter is visible. In order to prevent excessive "piling" when the wire is being reeled in, the reel should be mounted at least six inches above the fairlead and so placed that the point at which the antenna wire leaves the spool is in line with the axis of the fairlead, that is, for best operation there should be no bends in the antenna wire between the point where it leaves the reel and the far end of the fairlead. The four mounting bolts can be inserted in the reel base through the hole provided in the web of the spool. Unless the mounting screws themselves are grounded, a heavy grounding wire or strap should be clamped under the nut of one of the mounting screws for the purpose of thoroughly grounding all metal parts of the reel.

32. To fasten the antenna wire to the bottom of the spool channel it is first necessary to remove the spool cover by withdrawing it forward over the spool. This can best be done by placing the fingers of both hands on opposite sides of the cover and pressing on the spool with the thumbs. The end of the wire should be looped under the anchor pin in the spool hub and then twisted around the wire proper a few times. The twisted loop should then be placed in the groove and all of the wire wound on the spool by turning the crank in a clockwise direction. At this point the cover should be replaced by passing the wire through the slot opposite the wire opening and pushing the cover over the spool until it rests against the flange on the back plate. The cover should now be rotated so that the wire from the fairlead to the spool will not rub the edges of the wire opening in the cover either when the spool is full or nearly empty. The counter should now be set to zero. This should be done each time the reel is used in order to reduce the error in the reading caused by irregularities in winding.

33. Electrical connection to the radio transmitter is made by means of Connector Clamp MC-163, the installation of which is as follows:

a. Remove the brass bushing from Connector Clamp MC-163 by loosening screw in top of cover and fasten the antenna lead from the radio transmitter to this bushing by means of the screw provided.

b. Replace the bushing in cover and place the connector over the top of the fairlead, clamping it into place by means of the screw in the side of the cover.

c. Wind the desired amount of Wire W-106 on the spool and feed the free end through the connector clamp and fairlead until it touches the ground below the airplane.

d. Connect the free end of the wire to the cable loop on the Weight WT-9. Considerable care should be taken in making the connection between the antenna wire and the weight cable in order that the joint will run smoothly through the connector clamp when the antenna is being let out or reeled in. The loop formed in the antenna wire should be as small as practicable and the section where the antenna wire is twisted back upon itself should be tapered and made as short as a safe joint will permit.

e. Wind up the antenna wire in the reel until the Weight WT-9 rests securely in the fairlead socket. Let out and reel in approximately ten feet of the antenna several times (have someone pull lightly on the weight to keep the antenna wire tight) to insure that the connector clamp is working properly and that the joint between the antenna wire and weight cable runs smoothly through the clamp.

34. Fairlead Extension F-9 is used when the standard Fairlead F-8 is not long enough. It consists of Coupling MC-161 and a 36 inch length of standard phenolic tubing of the same cross section as the tube of Fairlead F-8. The extension is installed by slipping Coupling MC-161 over the top of the fairlead tube so that it covers approximately 3 inches of the tube and then securing it in place by means of one of the clamps provided. The tubing may then be clamped into the coupling by means of the remaining clamp. This tubing may be cut to fit a particular installation, or more than one extension may be used if required.

Interconnection with the Radio Receiver in Aircraft

35. It is necessary, in order to minimize receiver noise, that the cord shields be well grounded and so supported that they cannot rub on other cords or metal surfaces. In order that the radio receiver and the radio transmitter operation will be co-ordinated wires 21 and 22 of Plug PL-64 must be connected in series with the receiver plate supply. These wires are shown on Schematic Diagram Fig. 49 and are marked "Key Relay Arm" and "Key Relay Back."

PREPARATION FOR USE

36. After installation and before the equipment is put into operation, the circuits of all cords and external wiring should be checked to insure compliance with the circuit diagram and the applicable interconnection diagram. This circuit check should be made with all plugs removed from the sockets in the radio transmitter and power unit to determine that all cord and junction box connections are made as indicated on the diagrams. A voltmeter and battery may be used for this purpose. The plugs should be replaced in their respective sockets after this check.

Radio Transmitter BC-375-C

37. The following procedure is recommended for preparing the radio transmitter for use after installation:

a. Remove Plug PL-59 from the radio transmitter. Caution: Do not handle the unused plug.

b. Remove the tube compartment shield and insert the tubes. From the front of the radio transmitter, progressing from left to right, the tubes are as follows: (See Fig. 8)

Tube VT-25; Speech Amplifier
Tube VT-4-C; Master Oscillator
Tube VT-4-C; Power Amplifier
Tube VT-4-C; Modulator
Tube VT-4-C; Modulator

[illegible]

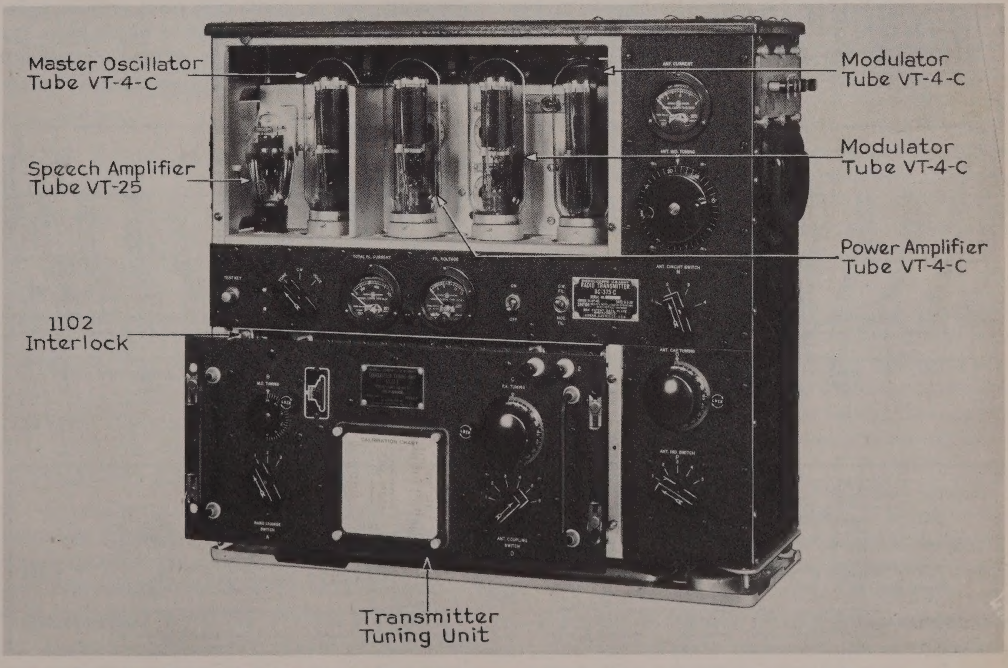


FIG. 8. RADIO TRANSMITTER BC-375-C, WITH TUBE COMPARTMENT SHIELD REMOVED AND TRANSMITTER TUNING UNIT TU-22-A BEING INSERTED

c. *Filament Adjustment:* (This radio transmitter is for d-c operation only)

(1). Remove all links from the filament resistor connection board. See Fig. 9.

(2). Assuming that the primary source voltage is 28 (the terminal voltage of a 24-volt storage battery under charge), place the 24 V./28 V. switch in the tube compartment in the 28.0 volt position.

(3). Set the transmitter signal switch on CW and the filament voltmeter switch on CW. FIL.

(4). Place the OFF-ON switch in the ON position. This should start the dynamotor and apply filament supply potential to the radio transmitter, but not to the tubes. With a screwdriver or a short piece of copper wire, No. 12 B & S or larger, connect between adjacent studs on the 28 V. and CW FILAMENT rows. The CW filaments will light and the filament voltmeter read. Repeat this until the two studs are found that when connected will cause the filament voltmeter to read 10 volts. Then place the OFF-ON switch in the OFF position and connect a link between the two studs just selected.

(5). Set the radio transmitter signal switch on VOICE and the filament voltmeter switch on MOD. FIL. Repeat the operation (4) for the 28 V. and MOD. FILAMENT rows of studs.

(6). Again place the OFF-ON switch in the ON position. Set the filament voltmeter switch on CW. FIL. (signal switch on VOICE). The CW filament voltage will now be less than 10 volts. In the same manner, connect between the adjacent studs of the COMP. and CW FILAMENT rows until the filament voltmeter again reads 10 volts. The OFF-ON switch may then be placed in the OFF position and the link fastened in the proper place.

(7). Cut off the charging generator, place the 24 V./28 V. switch in the 24-volt position and in a similar manner to the preceding select the proper studs on the 24 V. and CW FILAMENT rows and the 24 V. and MOD. FILAMENT rows so that the filament voltmeter will indicate 10 volts in either position. As now adjusted the filament voltages will not require further adjustment unless the cable lengths or charging rates are changed. Ordinarily, in aircraft installations, a battery-charging generator is used at all times. The 24 V./28 V. switch should accordingly be placed in the 28.0 volt position. If it is desired to check the operation of the radio equipment when the charging generator is below operating speed this switch should be changed to the 24 volt position since operation at low voltage will reduce the life of the tubes.

d. Replace Plug PL-59 in the radio transmitter.

Note: It will be noted that the filament voltmeter may show from 0.3 volt to 0.5 volt rise when the radio transmitter key is closed and plate current is being drawn. This is a normal condition of the radio transmitter circuits and should be ignored, providing the above filament adjustments have been made correctly.

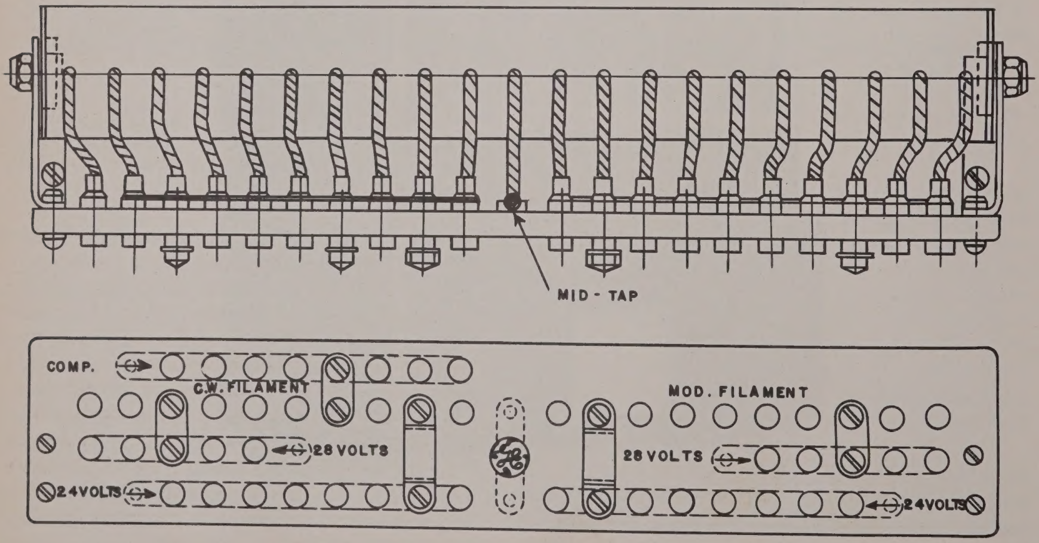


Fig. 9. Radio Transmitter BC-375-C, Filament Resistor and Terminal Board

Dynamotor Unit PE-73-B

38. Before being used for the first time, it is recommended that the end bells of the dynamotor be removed to make certain that the armature rotates freely in its bearings, and a check should be made to determine how much time has elapsed since the dynamotor unit was last serviced. If this time exceeds five months, follow the lubrication instructions appearing in paragraph 135. Do not lubricate more often or add more lubricant than is specified in those instructions.

39. The voltage at the input terminals of the dynamotor unit must be 28 volts in order to obtain rated power output from the transmitting equipment.

OPERATION

40. *At High Altitudes:* Radio Transmitter BC-375-C and associated equipment may be expected to give satisfactory service on CW at all altitudes up to 27,000 feet. On TONE and VOICE however, insulation breakdown may be experienced with Transmitter Tuning Unit TU-8-A (6200–7000 KC) above 25,000 feet and with Transmitter Tuning Unit TU-9-A (7700–10,000 KC) above 19,000 feet. These altitude limitations may be exceeded slightly by care in tuning and by carefully guarding against accumulation of dust and other foreign matter in the equipment. Complete assurance of effective operation between 6200 and 10,000 kilocycles at altitudes between 19,000 and 27,000 feet may be had on CW alone. Transmitter Tuning Unit TU-22-A may be expected to give satisfactory service at all altitudes up to 15,000 feet.

Transmitter Adjustment

41. WARNING: OPERATION OF THIS EQUIPMENT INVOLVES THE USE OF HIGH VOLTAGES WHICH ARE DANGEROUS TO LIFE. OPERATING PERSONNEL MUST AT ALL TIMES OBSERVE ALL SAFETY REGULATIONS. DO NOT CHANGE TUBES OR MAKE ADJUSTMENTS INSIDE EQUIPMENT WITH HIGH VOLTAGE SUPPLY ON. DO NOT COMPLETE OR MAINTAIN ANY CONNECTION BETWEEN TRANSMITTER AND DYNAMOTOR UNIT UNLESS ALL SHIELDS ON THE TRANSMITTER ARE IN PLACE.

42. Assuming that the installation and preliminary adjustments have been made in accordance with the foregoing instructions, the following operating procedure is recommended. Some of these adjustments need be made only at the time of installation.

43. Under no conditions should any of the switches on the radio transmitter or tuning unit be changed with the key or microphone button depressed. Insure that all switches position correctly; do not attempt to leave switches between points. Failure to observe this procedure causes undue arcing of the switch and severe strain on the vacuum tubes.

a. *CW Operation:* Select the transmitter tuning unit for the desired frequency. CW operation may then be obtained as follows:

(1) Place the signal switch on CW.

(2) From the calibration chart on the front of the transmitter tuning unit, set the BAND CHANGE SWITCH A, the M.O. TUNING Control and the P.A. TUNING Control for the desired frequency, and set the ANT. COUPLING SWITCH D on Point 1. (It should be remembered that the band change switch does not appear on Transmitter Tuning Units TU-7-A to TU-10-A inclusive.)

(3) Place the OFF-ON switch in the ON position. The dynamotor should now start and the m-o and p-a filaments will light. In case repeated failures of Fuse FU-22 are encountered and if such failures persist after compliance with instructions pertaining to Dynamotor Unit PE-73-B, it is recommended that Fuse FU-22 be removed from the relay-fuse box and one extra Fuse Link M-168 inserted in the fuse cartridge. Fuse FU-22 will then have two fuse links in it and should be replaced in the relay-fuse box of the dynamotor unit. In no case should the use of more than two fuse links be attempted.

(4) Press the TEST KEY or the transmitting key. The vacuum tubes will now draw plate current as indicated by the TOTAL PLATE CURRENT meter. The p-a tuning should be checked immediately for resonance by varying the control slightly until a minimum total plate current is indicated. When the p-a circuit is properly resonated, the total plate current will be from 80 to 110 milliamperes.

(5) The antenna should next be tuned to resonance. Because a wide variety of antennas is possible, no specific instructions for antenna tuning are given other than instructions to effect antenna resonance by means of the controls provided on the radio transmitter, and on the antenna tuning unit whenever the latter is in use. The subject of ANTENNA CIRCUITS is considered more in detail in paragraphs 45 to 66 of this instruction book, and should be referred to in preparation for operation of the equipment.

(6) Antenna resonance is indicated by a reading of current on the ANT. CURRENT meter and by an increase in total plate current. The increase in plate current is the more sensitive indication of approaching antenna resonance. When the antenna is tuned to resonance, the

total plate current reading will be somewhat higher than the off-resonance value. If the plate current is below 200 to 220 milliamperes, the coupling to the antenna should be increased by placing control D on a higher point and the antenna circuit retuned. When finally adjusted the total plate current should read from 200 to 220 milliamperes. If necessary, detune the antenna circuit slightly keeping the p-a dial, control C, in resonance to keep within the plate current limits.

(7) The equipment is now delivering rated power output, and the transmission may be carried on by operating the transmitting key. In order to shut down the equipment, it is necessary only to place the OFF-ON switch in the OFF position.

b. *Voice Operation:* Assuming that the equipment has been placed in operation on CW, the following procedure is recommended for obtaining VOICE operation. Note the value of total plate current for CW operation. Then place the signal switch in the VOICE position, and by means of the MOD. BIAS adjustment in the tube compartment, adjust until the total plate current with the microphone switch depressed is approximately 20 to 35 milliamperes higher than for CW. The modulator tubes are now biased nearly to cutoff for proper Class B operation, and radiophone communication may be carried on by speaking into the microphone. It will be noted that the total plate current increases when the microphone is spoken into. This increase is due to current drawn by the modulator tubes. With sustained normal level of speech impressed on the microphone, the plate current should rise to an average of 300 milliamperes. If this value is not obtained, the INPUT LEVEL control in the tube compartment can be adjusted until the proper amount of modulation, as indicated by the correct plate current, is obtained.

c. *Tone Operation:* After the equipment has been adjusted for VOICE operation, it is necessary only to place the signal switch on TONE for proper tone telegraph operation. The total plate current on TONE will be between 300 and 350 milliamperes.

d. *Speech-Amplifier Bias:* The correct speech-amplifier bias will usually be found between 6.0 and 7.5 on the S.A. BIAS adjustment dial. Settings in this range will normally give the proper speech-amplifier plate current and optimum side-tone frequency on all tuning units. It will usually be found that the side-tone bias settings on transmitters received from the factory will require no adjustment.

e. *Side Tone in Aircraft Set:* If the receiver circuits have been properly co-ordinated with the radio transmitter, the receiver control circuit will operate each time the transmitting key or microphone switch is closed, and the radio transmitter sidetone will be supplied to the headset. When the key or the switch is opened, the receiver again becomes operative, thus allowing break-in operation. The SIDE TONE level control, located in the tube compartment, is used to adjust sidetone to a suitable value for any particular installation. It will probably be noted that a higher level is desirable on VOICE position than on the CW and TONE positions.

f. *Calibration Reset:* Due to necessary manufacturing tolerances, the interelectrode capacity of a vacuum tube varies between limits fixed for each particular type of tube. Since the tube capacity is an appreciable part of any master-oscillator circuit, it is impossible to make up a calibration chart which will be exactly accurate for all tubes whose capacities are within the allowable limits. For this reason Radio Transmitter BC-375-C is provided with a calibration reset capacitor which enables the operator to reset the transmitter frequency to correspond with the calibration chart when the set is first placed in operation and thereafter whenever the master-oscillator tube is changed. A heterodyne frequency meter or other standard of frequency is required. The procedure is as follows:

(1) Allow radio transmitter to warm. The operator will obtain the most accurate results by allowing the transmitter to "warm up" on key locked "CW" for a period of at least 20 to 30 minutes before setting the calibration reset capacitor or checking the calibrated transmitter frequency.

(2) With the transmitter tuning unit for the highest available working frequency placed in the radio transmitter, tune the radio transmitter for CW operation on one of the calibrated frequencies at the high frequency end of the band. (Approach the calibrated point by proceeding from a lower dial reading to a higher one.)

(3) Place the frequency meter in operation and adjust it to the frequency indicated on the transmitter calibration in accordance with the operating instructions and calibration chart furnished with the frequency meter. The calibration accuracy of this frequency meter should be 0.01 per cent, or better.

(4) Open the calibration reset port, located on the front panel, between the TEST KEY and TONE-CW-VOICE switch, insert a screwdriver, and rotate the calibration reset capacitor until the transmitter frequency coincides with that of the frequency meter or standard.

(5) Close the calibration reset port.

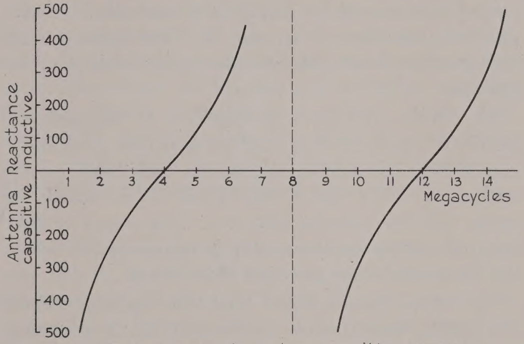
44. The radio transmitter calibration is now reset for any tuning unit of the same order number and serial number as the transmitter and the accuracy of calibration will be within 0.05 per cent plus the accuracy of the standard. The calibration must be checked in this manner each time the m-o tube is changed.

Antenna Circuits

45. The antenna is, in general, a system of conductors which, when excited by a radio-frequency voltage, sets up an electromagnetic and electrostatic field causing a component of this field to travel away from the antenna with the velocity of light.

46. The radiation characteristics of antennas, directivity and radiation efficiencies are determined by their physical shape and location with respect to other bodies. In aircraft, since there is no wide latitude in physical design of fixed antennas, the problem becomes mainly one of determining the best methods of operating available designs.

47. It is necessary first to determine how the antenna impedances vary at the operating frequencies in order that the loading facilities may be properly used. The reactance of an antenna may be approximated from the theory of transmission lines in which uniformly distributed inductance and capacity are assumed, resistance and insulator leakage being neglected.



Typical curve for antennas with 4000 KC. fundamental frequency

FIG. 10. ANTENNA REACTANCE CURVE

48. Selecting a certain length of antenna and plotting its reactance variation with frequency, we obtain repeating cotangent curves. It may be seen that at certain frequencies the reactance becomes zero. Under these conditions, the antenna is "resonant," analogous to a simple-series circuit tuned to resonance.

49. It may be noted that the "series" resonant points occur at all odd multiples of the first resonant frequency, which is called the fundamental frequency. The fundamental frequency, the third harmonic, and the fifth harmonic, all points of zero reactance, correspond to a voltage distribution along a simple vertical wire of "quarter-wave," "three-quarters wave," and "five-quarters wave." Antennas of this type, operated at zero or low reactances, are commonly called "current fed"; that is, they require low driving voltages for their operation.

50. At even multiples of the fundamental frequency, it may be seen that the antenna reactance is very high. Operation at the second and fourth harmonics corresponds to "half-wave" and "full-wave" operation. Under these conditions, antennas are "voltage fed"; that is, they require high driving voltages.

51. The resistance component of the antenna impedance is made of two parts; radiation resistance which represents the radiation of power or waves away from the antenna and which is productive of a useful result; and loss resistance which is a combination of losses due to conductor and ground resistance, and to dielectric hysteresis. Loss resistance performs no useful function and every effort should be made to maintain it very small in comparison with the radiation resistance. The efficiency of an antenna with respect to radiation of power may be expressed as the ratio of radiation resistance to total antenna resistance.

52. Antenna resistance varies over wide limits with frequency. The resistance values approach very high values at the even harmonics, and minimum values at the odd harmonics. It is thus seen that the operation of a transmitter over a wide frequency band requires that the transmitter be capable of providing a considerable range of output voltages. This is accomplished in each transmitter tuning unit by a six-point ANT. COUPLING SWITCH, control D. In order that the voltage range required be kept a minimum, antennas are usually "resonated," that is, they are series tuned by either inductance or capacity as may be necessary so that the required output voltage range depends only on the antenna resistance variation over the desired frequency range. Transmitter Tuning Units TU-3-A and TU-22-A have a series capacitor in use when control D is on position 6 for resonating when operating into a pure resistance approximating 40 ohms. Do not operate position 6 into low resistances as the large amount of resonant current will overload this series capacitor.

53. When operating antennas at frequencies lower than their fundamental, or odd harmonics, they appear to the antenna tuning equipment as a capacity in series with a resistance. In order to balance out this capacitive reactance, it is necessary to load the antenna by means of an inductance, the reactance of which is made equal to that of the apparent antenna capacity. For operation of antennas at frequencies

higher than their fundamental and odd harmonics, the converse is true, a capacity in series with the antenna being necessary in order to balance the apparent antenna inductive reactance

54. In most cases, except where ¾ and 5/4 wave trailing wires are used for high frequencies, antenna operation will be around the fundamental frequency.

55. In general, it may be said that if antennas are operated so that their effective length is an appreciable percentage of the operating wavelength, they will have marked directive properties. This corresponds to operation near to and higher than the fundamental frequency. When antennas are operated at frequencies much lower than the fundamental, the ratio of radiation to total resistance is less favorable, but the directive properties are not nearly so evident. The fundamental frequency of an antenna depends mainly on its effective length including the ground lead. Fundamental frequencies in the range 2500-7000 kilocycles will be the most common with the usual types of fixed antennas, while fundamentals as low as 1500 kilocycles will be obtained with 200-foot trailing-wire antennas.

56. The antenna tuning equipment in the radio transmitter is designed to feed antennas at any frequency from 800 to 12,500 kilocycles. Over this band of frequencies it is necessary to feed antennas at, above, and below their fundamental frequencies. Therefore, the circuit and circuit constants are so selected as to permit of both current and voltage feed. A rotating inductor and a tapped inductance provide the inductive reactance variation. A variable capacitor provides the variation in capacitive reactance and also serves as coupling impedance for voltage feed. Controls governing the variation in inductive or capacitive reactance are so arranged that inductance or capacity are increased with increase in dial reading.

57. With the ANT. CIRCUIT SWITCH, N, on position 1, the radio transmitter works into a simple series resonant circuit, in which the high voltage built up across the antenna tuning capacitor is used to "voltage feed" the antenna. This circuit is generally used for high frequencies and fairly long fixed antennas. The antenna feed circuit is maintained at resonance by means of ANT. IND. TUNING, M, while the voltage fed to the antenna is varied by means of ANT. CAP. TUNING, O, and ANT. COUPLING SWITCH, D. Feed circuit resonance is indicated by the ANT. CURRENT meter. The current in the feed circuit is adjusted by control D and should not exceed 6 amperes. The step by step tuning procedure is as follows:

a. Set control O at some arbitrary scale reading.

b. Resonate circuit by means of control M for a maximum reading on ANT. CURRENT meter.

c. Adjust control D so that antenna ammeter reads below 6 amperes.

d. Re-resonate circuit as in step b.

58. Repeat the above procedure until the proper loading (200-220 ma on CW) is indicated on the plate ammeter. The lower the dial reading on control M and the lower the reading on the ANT. CURRENT meter that it is possible to obtain at a given frequency, the more power will actually be delivered to a given antenna. The lower the reading on control M and the lower the ANT. CURRENT meter readings, the less the tuning circuit losses and thus more useful power is delivered to the antenna for radiation purposes.

59. With ANT. CIRCUIT SWITCH, N, on position 2, the radio transmitter works into a series resonant circuit where the antenna is "current fed." The antenna circuit is resonated by means of ANT. IND. TUNING, M, and ANT. CAP. TUNING, O, as indicated by the ANT. CURRENT meter. This circuit is used generally for operation near the fundamental frequency of the antenna.

60. With control N on position 3, the radio transmitter works into a series resonant circuit providing "current feed" and inductive loading. The antenna circuit is resonated by means of a continuously variable rotating inductor, control M. This circuit is used for operation below the fundamental frequency of the antenna.

61. With control N on position 4, the antenna circuit is identical with that obtained on position 3 except that an additional tapped inductance, controlled by ANT. IND. SWITCH, P, is added in series with the rotating inductor. This circuit is used when the operating frequency is relatively far below the fundamental frequency of the antenna.

62. It is recommended that the operator check the possible resonance of coil, item 1170, at operating frequencies above 4500 kilocycles. Although this coil is not connected in the antenna circuit, the inherent capacity coupling may cause absorption of useful radio-frequency power. Absorption may be easily determined by placing control switch P at several points while watching the antenna current. Control P must not be allowed to remain at a point which indicates a decrease in antenna current. In general, it will be found that no difficulty will occur if the following points are used.

Transmitter Tuning Unit	"P" Switch Position
TU-7-A	2
TU-8-A	5
TU-9-A	5
TU-10-A	5

63. The antenna resonance is then made in the usual manner using controls M, N, and possibly O.

64. For operation in the frequency range of 150 to 800 kilocycles, the externally connected Antenna Tuning Unit BC-306-A is used. This unit contains the necessary inductive reactance to resonate specified antennas at frequencies well below their fundamental. The variation in inductive reactance is provided by the ANTENNA VARIOMETER SWITCH, control E, and the ANTENNA VARIOMETER, control F. The proper connections are described in the section on INSTALLATION. In general, it will be necessary to use Antenna Tuning Unit BC-306-A with Transmitter Tuning Units TU-1-A, TU-2-A, and TU-3-A, and TU-22-A, i.e. 150 kc to 800 kc. The antenna loading equipment contained in the radio transmitter will resonate a 400 micromicrofarad antenna to approximately 650 kilocycles. Therefore, when the minimum inductance is reached on the BC-306-A, (E=2, F=0), place control E in position 1 which disconnects this unit. Proceed to resonate the antenna circuit with control N on position 4. Control M is the continuously variable inductance between inductance steps on control P.

65. Under some conditions, it may be found that one coupling tap will not give sufficient loading while the next higher tap will give overloading of the radio transmitter. In this case use the higher coupling tap by slightly detuning the antenna circuit and keeping the p-a dial, control C, tuned to a minimum plate current until the normal transmitter loading of 210 to 220 milliamperes total plate current is obtained.

66. When operating into antennas of the trailing wire type it is advisable that the antenna circuit be resonated by adjusting its length as close as possible to the ¼ or ¾ wave point. This type of operation results in the removal of all transmitter tuning equipment from the antenna circuit and results in greatly increased antenna power. For this type of operation the antenna circuit switch, control N, should be placed on position 3 and the antenna loading coil, control M, set at zero. The antenna is then resonated by adjusting its length to a point that results in a maximum of antenna current. Coupling control D should be set so as to give normal plate loading and control C should be tuned for minimum plate current. The approximate length of wire required for various operating frequencies is given in paragraph 72.

Dynamotor Unit PE-73-B

67. Starting and stopping of the dynamotor unit is controlled by the "Off-On" switch at Radio Transmitter BC-375-C or remotely by a switch which may be wired to point 20 of Plug PL-64.

68. When operated at full-rated load continuously for ½ hour the temperature rise of the dynamotor will not exceed 55 degrees Centigrade. However, if the dynamotor is operated for a greater length of time, even at lighter loads, without being allowed to cool off, its temperature will continue to increase and will ultimately reach values which are injurious to the insulation and may even burn out the windings. This also applies to the starting relay. If it is desired to operate the dynamotor unit continuously at full load for a period greater than ½ hour (such as for testing purposes in the laboratory) the end bells of the dynamotor and the cover of the relay-fuse box should first be removed. The dynamotor unit can then be operated at rated load continuously. for any period of time without injurious heating. Care should be exercised to place guards around the dynamotor unit when operated in this manner so that operators cannot come in contact with exposed high voltages. When operated in conjunction with the radio transmitter, the dynamotor operates at practically zero load unless the key or microphone switch is closed. Continuous operation under this condition will not result in overheating although the radio transmitter should be turned off whenever possible between periods of transmission.

Reel RL-30-B

69. Braking, locking and winding operations are controlled from the crank on the reel. Normally the reel is in the locked position such that the wire will not unwind from the spool. Reeling-in is accomplished by rotating the crank in a clockwise direction, as indicated by the direction arrow "Wind" on the nameplate at the center of the reel spool. A ratchet mechanism on the spool prevents the wire from unreeling when the crank is released. By rotating the crank in a counterclockwise direction the braking mechanism is released, thereby permitting the wire to be reeled out. Braking force decreases gradually as the handle is rotated through approximately the first 40 degrees of its motion. Beyond this point and up to the extreme limit of its motion the brake is completely released and the spool is free to spin. The speed of unwinding can be readily controlled by regulating the braking effect with the crank. A spring return on the crank automatically resets the brake to the normal or locked position when it is released.

70. Tuning the antenna by adjusting its length should be accomplished by allowing slightly more wire than is necessary to run from the reel and then reeling in slowly to obtain the proper length by observing the resonant condition. During the reeling out operation, care should be taken that all of the wire is not unreeled. The speed with which the reeling takes place would be sufficient to snap the wire if it reached its ultimate length, causing a loss of both the weight and wire.

71. WHEN UNREELING WIRE, NEVER ALLOW THE CRANK TO SNAP INTO THE LOCKING POSITION WHEN THE SPOOL IS ROTATING RAPIDLY. THE SUDDEN STOP WHICH WOULD RESULT MAY BREAK THE ANTENNA WIRE AND PLACE UNDUE STRESS ON THE REEL MECHANISM.

72. The following table gives the approximate antenna length for various frequencies as well as the approximate counter reading when 250 feet of Wire W-106 is wound on the spool.

KC	**¼ Wave**		**¾ Wave**	
	Length (FT)	**Counter Reading**	**Length** (FT)	**Counter Reading**
2000	123	108		
3000	82	72		
4000	62	54		
5000	49	44	147	130
6000	41	36	123	108
7000	35	30	105	92
8000	31	28	93	82
9000	27	24	81	72
10000	24	22	73	64

Operating Routine

73. The operating routine and type of transmission to be used will be governed by tactical requirements. The following recommendations are given, however, to assist in routine operation of equipments:

a. Complete equipment operation should be checked before the start of any mission.

b. Make certain that spare fuseholders are filled with good fuses, and that spare tubes (if carried) are in good condition.

c. The transmission range of the equipment on CW is considerably greater than on VOICE. If distance, atmospheric noise, etc., make voice communication difficult, changing to TONE or CW will probably improve communication.

d. In case of failure of one or two VT-4-C vacuum tubes with no spares on hand, CW communication can be carried on by inserting the good tubes in the m-o and p-a sockets. CW operation can also be maintained when Tube VT-25 is removed, although no sidetone will be supplied in this event.

SUMMARY COVERING NORMAL OPERATION

74. Although the normal operation of this equipment is extremely simple after the correct installation has been made, it is well to study the proper sequence of various equipment procedure as summarized in the following paragraphs. It is assumed that the installation has been tested and all circuits are normal.

DO NOT CHANGE ANY SWITCHES WITH THE KEY OR MICROPHONE BUTTON DEPRESSED.

a. *To start the equipment:* place the OFF-ON switch to ON. The dynamotor will start and the filaments will light. Unless the TONE and VOICE emissions have been adjusted, start up initially as given below. To control carrier depress the key.

b. *To stop the equipment:* open the key then place the OFF-ON switch in OFF.

c. *To change frequencies:* select the required tuning unit and place in the radio transmitter. Place the MO dial, BAND SWITCH (if any), and the PA dial on the desired calibrated frequency as given on the calibration chart. Place the emission switch on CW, start up the radio transmitter and immediately check the PA dial for minimum plate current as indicated on the TOTAL PLATE CURRENT meter. Resonate the antenna circuit and load to a total plate current of 210 to 220 milliamperes with the PA dial resonated, i.e., always tuned to a minimum plate current. Proceed to key the carrier on CW or select the other types of emission as given below.

d. *To select any available type of emission:* start up the radio transmitter and tune for CW transmission first as given under c; then open the key and place the TONE-CW-VOICE switch on VOICE. Remove the tube shield and adjust the MOD. BIAS control after key is depressed until the total plate current reads 20 to 30 milliamperes above the CW value. Proceed to control carrier by microphone button and modulate by voice. Adjust the side tone signal to the desired level by means of the SIDETONE control located in the tube compartment. Adjust the voice level by the INPUT LEVEL control so the total plate current reaches 300 to 350 milliamperes on peaks of sustained voice.

e. *For tone transmission:* the operator must always adjust radio transmitter for VOICE, first. Then open the key, place the selector switch on TONE and proceed to key carrier as in CW.

f. *To increase power output:* go to a higher number on the ANTENNA COUPLING SWITCH, control D, at the same time keeping the PA dial, control C, and the antenna circuit in resonance. Power may be increased until a CW plate current of 220 ma. at 28 volts input is reached.

g. *To decrease power:* go to a lower number on ANTENNA COUPLING SWITCH, control D, at the same time keeping the PA dial, control C, and the antenna circuit in resonance.

h. It should be noted that the CW power output may be increased or decreased in the above manner from the value of plate current with the antenna circuit open to the full load rating of 220 milliamperes. However, the TONE and VOICE carrier power SHOULD NOT BE INCREASED OR DECREASED. Unless the TONE and VOICE carriers are adjusted as given under steps d. and e. above, distortions will result. Also, the misadjustment may cause arcovers which would damage the equipment.

i. *To reset to the calibration chart* after changing of the m-o tube, etc., start the radio transmitter on the highest frequency of the highest frequency tuning unit available. Warm up the radio transmitter on CW key locked for 10 to 20 minutes. The tube shield must be in place. Listen to the calibrated frequency on a suitable accurate heterodyne frequency meter and adjust the radio transmitter to zero beat by means of a screw driver inserted into the reset port on the left front of the radio transmitter panel. This should bring the radio transmitter back to calibration and all other frequencies should be within 0.05 per cent. For greater accuracies reset as above to the exact frequency desired.

III. DETAILED FUNCTIONING OF PARTS

RADIO TRANSMITTER BC-375-C

75. In order that the theory of the principal component units may be better understood, the complete circuit has been broken down into several simplified circuits as shown on the functional diagrams which follow. Each basic circuit will be described in detail.

76. The radio-frequency circuit of the radio transmitter (see Fig. 11) is of the conventional master-oscillator and power-amplifier type. The audio-frequency circuit consists of a speech amplifier and a Class B audio-frequency modulator which applies plate modulation to the Class C radio-frequency power amplifier. When operating on TONE, the speech amplifier is converted into an audio-frequency oscillator which supplies grid excitation at a frequency of approximately 1000 cycles to the modulator tubes.

77. Side tone for monitoring purposes is supplied during VOICE, TONE, and CW operation. CW side tone is obtained by the use of the speech-amplifier tube as an audio oscillator.

78. The master-oscillator and power-amplifier radio-frequency circuits are built into the transmitter tuning units, of which 10 are required to cover the complete frequency range of the equipment.

79. The master-oscillator circuit is of the "series fed" type, either capacitively or inductively coupled to the power amplifier depending on the tuning unit in use. Assuming that a Transmitter Tuning Unit TU-8-A (6200–7000 kc) is in place in the radio transmitter, the radio transmitter circuits will be discussed in detail (see Fig. 11).

80. The tapped coil 801 and the capacitor 802 comprise the radio-frequency oscillating circuit.

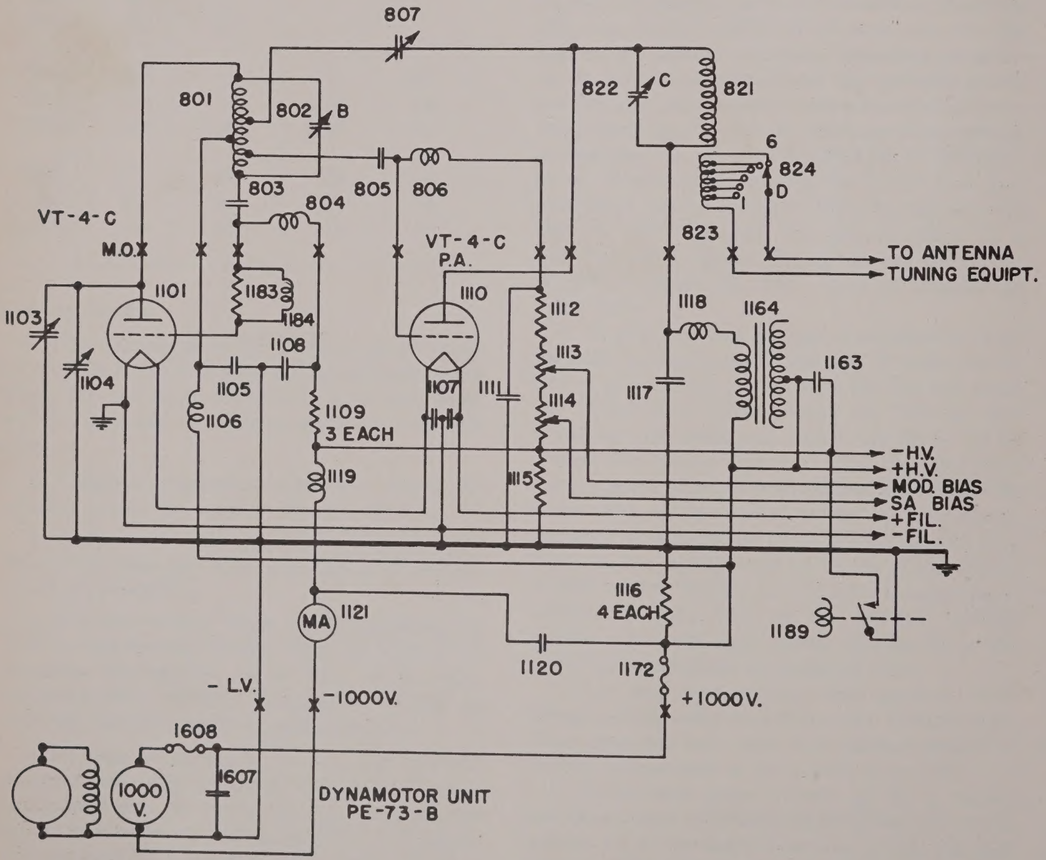

807
801
802
B
822
C
821
6
824
D
1
803
805
806
804
VT-4-C
M.O.
VT-4-C
P.A.
823
TO ANTENNA
TUNING EQUIPT.
1101
1183
1184
1110
1112
1118
1164
1103
1104
1108
1113
1163
1105
1106
1107
1111
1114
1117
1109
3 EACH
1119
1115
-H.V.
+H.V.
MOD. BIAS
SA BIAS
+FIL.
-FIL.
1116
4 EACH
MA
1121
1189
1120
1172
- L.V.
-1000V.
+1000V.
1608
1607
1000
V.
DYNAMOTOR UNIT
PE-73-B

Fig. 11. Radio Transmitter BC-375-C, Functional Diagram of Radio-Frequency and High-Voltage Circuits

Both the coil and the capacitor are thermally compensated to reduce frequency variation due to changes in ambient temperature. Capacitor 802 is provided with a front of panel control (B) by means of which the oscillator may be adjusted to the desired frequency. The center tap on the coil determines the master oscillator grid excitation. The coil is also tapped an equal number of turns on either side of this center tap, the lead connecting to capacitor 805 furnishing the power-amplifier (p-a) grid excitation. Master-oscillator (m-o) grid excitation is taken through capacitor 803, which blocks the plate voltage off the grid circuit. Resistor 1183 and choke 1184 in parallel are connected in series with the grid to prevent the generation of parasitic oscillations. Plate power for the m.o. is fed to the tuning unit through r-f choke 1106, which, with capacitor 1105 prevents r.f. from flowing into the power supply.

81. Resistor 1109 is the m-o grid leak which provides the required operating bias for the m-o tube from the rectified grid current. Capacitor 1108 is an r-f bypass. Grid choke 804, in conjunction with resistor 1109, serves as the necessary direct current path from the grid to filament, maintaining a high impedance to the r-f grid excitation.

82. Capacitor 1103 is the calibration reset, by which the master-oscillator frequency can be adjusted to correspond to the calibration whenever the oscillator tube is changed. Capacitor 1104 provides thermal compensation for frequency drift normally caused by warmup and variation of ambient temperature of the oscillator tube.

83. The p-a tank circuit consists of coil 821 and variable capacitor 822. This capacitor has a panel control (C) for tuning the tank circuit to resonance. The p-a grid receives excitation through capacitor 805 from the m-o tank coil. Capacitor 805 also isolates the m-o plate voltage from the p-a grid. The p-a grid bias is obtained from the flow of rectified grid current through resistors 1112, 1113, and 1114. Choke 806 provides a low impedance path for the d-c grid current but a high impedance path at radio frequencies. Plate power for the p.a. is fed to the tuning unit through choke 1118, which, with capacitor 1117, prevents r-f current from flowing into the power supply.

84. The neutralizing capacitor 807 forms a part of a bridge circuit including the power-amplifier grid-to-plate capacity. Balancing of this circuit by means of capacitor 807 prevents any reaction of the power amplifier on its grid-input circuit, thus eliminating the possibility of self-oscillation of the amplifier. All transmitter tuning units are properly neutralized at the factory, and should never require adjustment in service unless the setting is accidentally disturbed. Instructions for making the neutralization adjustment are given in the "Service Notes" included in this instruction book.

85. The p.a. is inductively coupled to the antenna circuit by means of the tapped inductance 824; the taps on which are selected by a panel-controlled tap switch 823 labeled ANT. COUPLING SWITCH, D. Sufficient variation in coupling is provided to allow operation into a wide range of antenna resistances.

86. The operation of the ten other types of transmitter tuning units is very similar to that described above, the only difference being in the methods by which the m-o and p-a circuits are tuned over their respective frequency bands. A detailed discussion of the circuits involved is included in the description of the transmitter tuning units later in these instructions.

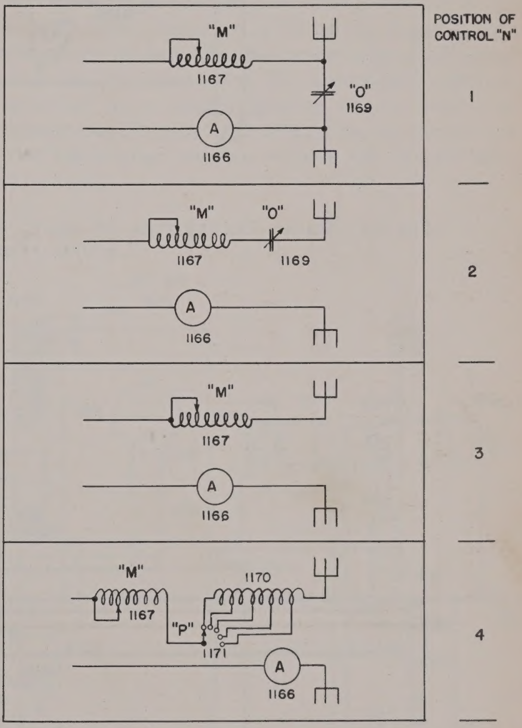


Fig. 12. Radio Transmitter BC-375-C, Functional Diagram of Antenna Tuning Circuits

87. The antenna tuning equipment and circuits provided in the radio transmitter are designed for operation with aircraft antennas at frequencies above 800 kilocycles. Rotating inductance 1167, control M; inductance 1170; switch 1171, control P; variable capacitor 1169, control O; switch 1168, control N; and r-f ammeter 1166 comprise the antenna

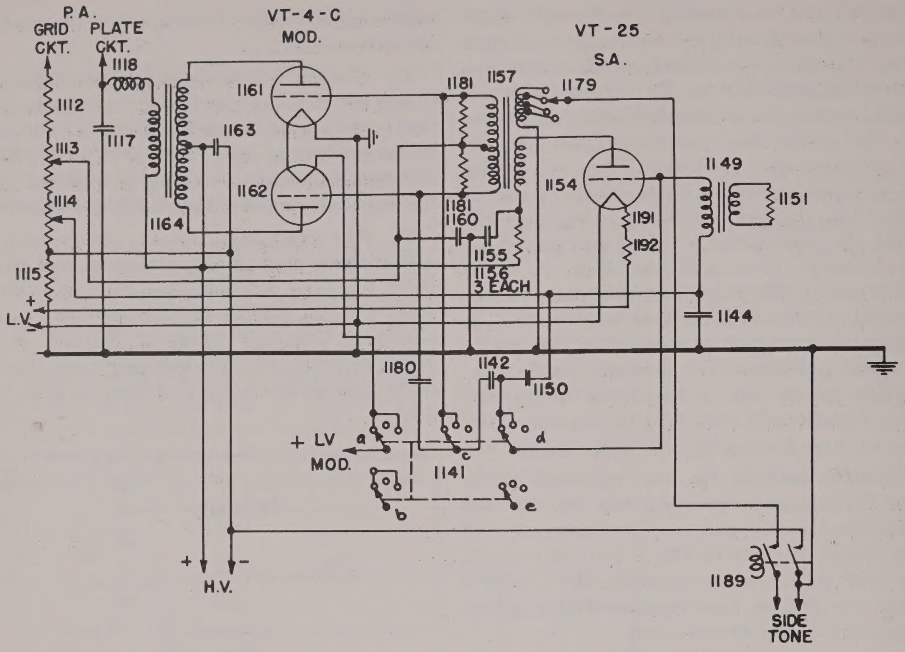

P.A.
GRID CKT.
PLATE CKT.
1118
1112
1117
1113
1114
1115
+
L.V.
-
VT-4-C
MOD.
1161
1162
1163
1164
VT-25
S.A.
1181
1157
1179
1154
1149
1151
1181
1160
1191
1192
1155
1156
3 EACH
1144
1180
1142
1150
+ LV
MOD.
a
c
d
1141
b
e
+
H.V.
-
1189
SIDE
TONE

Fig. 13. Radio Transmitter BC-375-C, Functional Diagram of Audio-Frequency Circuits—Tone Operation

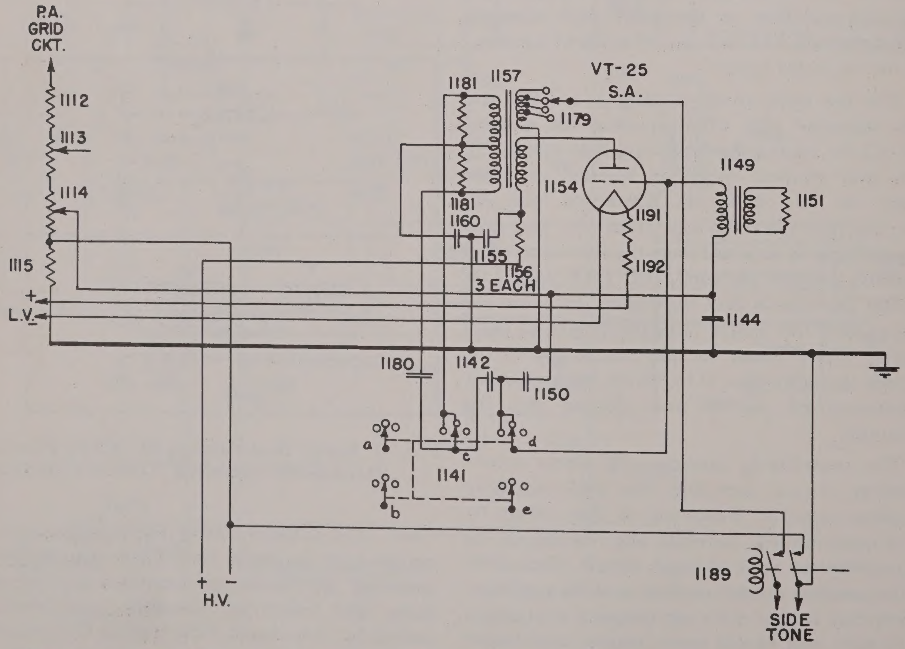

P.A.
GRID
CKT.
1112
1113
1114
1115
+
L.V.
-
1181
1157
VT-25
S.A.
1179
1154
1149
1151
1181
1160
1191
1155
1156
3 EACH
1192
1144
1180
1142
1150
a
c
d
1141
b
e
+
-
H.V.
1189
SIDE
TONE

Fig. 14. Radio Transmitter BC-375-C, Functional Diagram of Audio-Frequency Circuits—CW Operation (Side Tone)

tuning equipment which is included in the radio transmitter unit. These parts may be connected to form four different antenna feed circuits corresponding to the four positions of the ANT. CIRCUIT SWITCH, control N, symbol 1168. Fig. 12 shows four simple line diagrams, marked (1) to (4) respectively, which indicate the type of antenna tuning circuit provided for the correspondingly numbered positions of control N. With this switch in position (1), the radio transmitter works into a simple series resonant circuit consisting of the tuning inductance 1167, control M, and the tuning capacitor 1169, control O; with the antenna ammeter indicating the current in the resonant circuit. The high voltage built up across the tuning capacitor is used to voltage feed the antenna. With control N in position (2), the tuning inductance and tuning capacitor are connected in series with the antenna permitting operation near the fundamental frequency of the antenna, i.e., where only small amounts of inductive or capacitative loading are required. Positions (3) and (4) provide inductive loading of the antenna with either tuning inductance 1167 alone or the tuning inductance and the tapped inductance 1170, controlled by switch 1171 control P, in the circuit. The antenna ammeter 1166 indicates actual resonance of the antenna circuit for positions (2), (3) and (4) of control N.

88. Modulation is applied to the plate supply of the power amplifier by means of the modulation transformer 1164. The modulator tubes, 1161 and 1162, are operated in a push-pull Class B circuit, in which they are biased nearly to cut off. This type of operation is characterized by high efficiency and output. The modulator power drain is negligible unless the tubes are being driven by the speech amplifier or tone oscillator. The modulator tubes receive excitation from the speech-amplifier tube 1154 through an interstage transformer 1157. The secondary of this transformer is loaded by resistors 1181 to reduce the effective load variation caused by the modulator grid current. Plate power for the speech amplifier is obtained from the positive high voltage through resistor 1156 which limits it to the proper value. Capacitor 1155 serves as an audio-frequency by-pass for this power source. Receiver side tone for monitoring the transmitted signal is provided by a tapped winding on the interstage transformer. Switch 1179 selects the proper tap on this transformer winding to give the desired side-tone level.

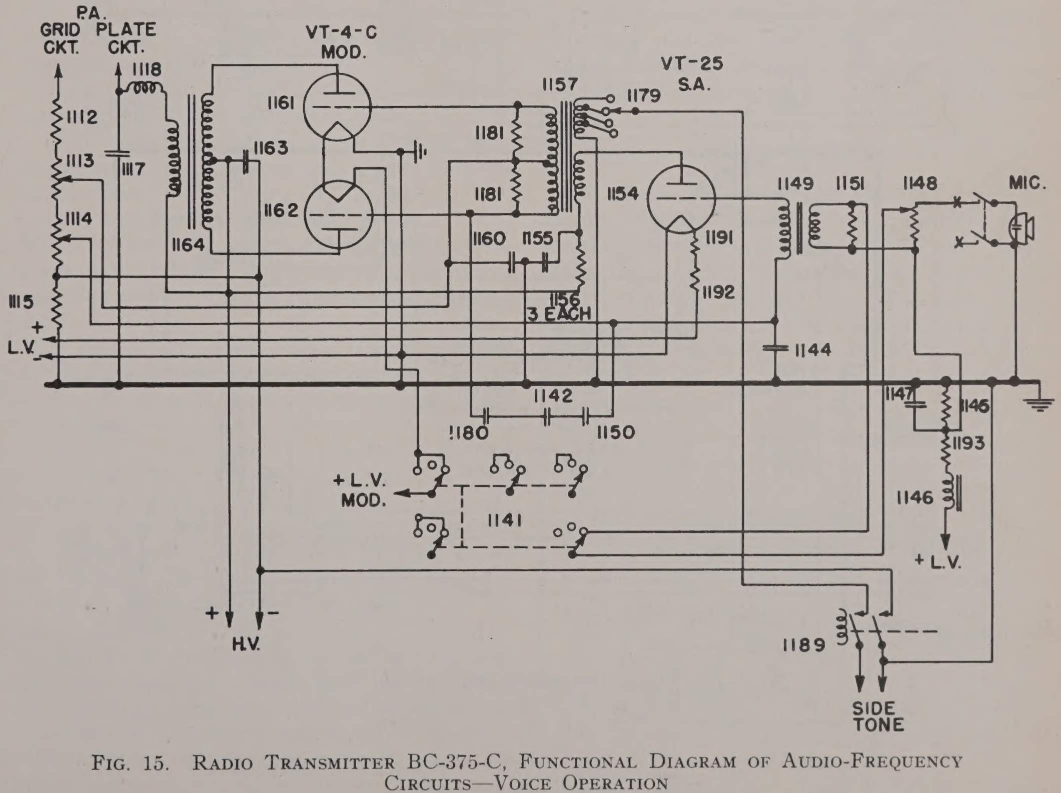


FIG. 15. RADIO TRANSMITTER BC-375-C, FUNCTIONAL DIAGRAM OF AUDIO-FREQUENCY CIRCUITS—VOICE OPERATION

89. The TONE-CW-VOICE switch 1141 serves to select the desired type of transmission. It performs the following functions:

a. It controls the modulator filaments.

b. It controls the line compensating section of the filament resistor 1196.

c. It controls the tone oscillator feed-back circuit.

d. It connects the microphone circuit to the input transformer 1149 for VOICE operation.

90. With switch 1141 in the TONE position, (Fig. 13), capacitor 1142 feeds energy from the speech-amplifier plate to its grid in the proper phase relation to cause oscillation at an audio rate. The secondaries of input transformer 1149 and interstage transformer 1157 are resonated by capacitors 1150 and 1180 respectively to provide the desired frequency of oscillation. Resistor 1151 on the primary of the input transformer serves to stabilize the grid excitation of the speech-amplifier tube. The modulator tubes receive their excitation from transformer 1157.

91. For CW operation (Fig. 14), switch 1141 shuts off the modulator tubes by removing filament power. The speech amplifier functions the same as for TONE operation although it furnishes only the audio-frequency signal (receiver side tone) for monitoring the CW transmission.

92. In the VOICE position (Fig. 15), switch 1141 disconnects the tone capacitors (1142, 1150, and 1180); connects the microphone circuit to the primary of the input transformer 1149 and makes the modulator tubes operative by connecting their filaments to the supply. Potentiometer 1148 is the input level control. The speech amplifier will then receive its excitation from the microphone by means of input transformer 1149. The transmission is monitored through the receiver side-tone circuit.

93. Bias for the modulator tubes is obtained from resistor 1113, and bias for the speech amplifier from resistor 1114. These resistors form a part of the p-a grid leak, the voltage across them resulting from the rectified grid current of the p.a. Capacitors 1144 and 1160 serve to by-pass the speech-amplifier and

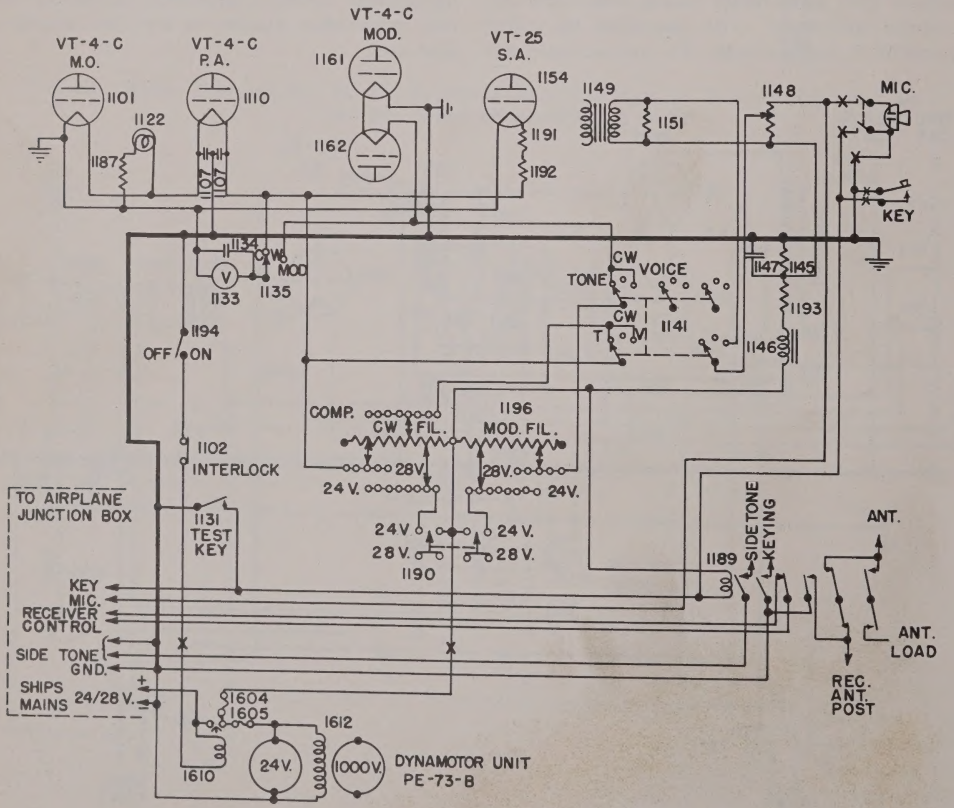

VT-4-C
M.O.
VT-4-C
P.A.
VT-4-C
MOD.
VT-25
S.A.
1101
1110
1161
1162
1154
1122
1187
1107
1149
1151
1191
1192
1148
MIC.
KEY
1134
CW
MOD
1135
V
1133
CW
TONE
VOICE
CW
T
M
1141
1147
1145
1193
1146
1194
OFF
ON
COMP.
CW
FIL.
1196
MOD. FIL.
28V.
28V.
24 V.
24V.
1102
INTERLOCK
TO AIRPLANE
JUNCTION BOX
1131
TEST
KEY
24V
28 V.
24 V.
28 V.
1190
SIDETONE
KEYING
1189
ANT.
ANT.
LOAD
REC.
ANT.
POST
KEY
MIC.
RECEIVER
CONTROL
SIDE TONE
GND.
SHIPS
MAINS
24/28 V.
+
-
1604
1605
1612
1610
24V.
1000V.
DYNAMOTOR UNIT
PE-73-B

FIG. 16. RADIO TRANSMITTER BC-375-C, FUNCTIONAL DIAGRAM OF LOW-VOLTAGE AND CONTROL CIRCUITS

modulator bias respectively at audio frequencies. Both the modulator bias control, labeled MOD. BIAS, and the speech-amplifier bias control, S.A. BIAS, are accessible in the tube compartment. Instructions for adjustment of modulator bias are given under II. EMPLOYMENT in this instruction book. The speech-amplifier grid bias is adjusted to the correct value at the factory and its value is not relatively critical. Instructions for its adjustment, should this be necessary, are given under section IV, MAINTENANCE—Service Notes.

94. Keying of the radio transmitter is accomplished by means of resistor 1115, one end of which is connected to negative high voltage and the grid circuit returns, and the other end to filament or ground potential. The keying contacts of relay 1189 are connected across this resistor. When the contacts are opened, the resistor network consisting of resistors 1115 and 1116, connected from positive to negative high voltage so divide the voltage that the grids of the tubes are biased beyond cut-off, and oscillations are stopped.

95. The keying and antenna switching relay performs the following functions, see Fig. 16:

a. It keys the radio transmitter by short-circuiting resistor 1115 (refer to Fig. 11).

b. It disconnects the receiver from the antenna and grounds the receiver input circuit when the transmitting key is closed.

c. It connects the radio transmitter to the antenna circuit when the key is closed.

d. It opens the receiver screen grid or plate supply or operates a receiver control relay when the key is closed.

e. It keys the side-tone circuit.

96. Test key 1131, which may be used to close the keying relay while checking operation or making tuning adjustments, is located on the radio transmitter panel.

97. Control and power circuit connections are made through the sockets and jack provided on the left side of the radio transmitter unit. Low-voltage and power-control circuits enter the transmitter through Plug PL-61 inserted in socket 1126. The positive high-voltage connection enters this unit through Plug PL-59 in socket 1127. Interphone, side tone, and receiver keying connections to the junction box, if used, are made by means of Plug PL-64 in socket 1128. Jack 1129 is for microphone and key connections for locally controlled operation of the radio transmitter.

98. OFF-ON switch 1194 serves to close the dynamotor relay and thereby apply power to the radio transmitter. Interlock 1102 serves to remove power from the radio transmitter when the transmitter tuning unit is not in place. Indicator lamp 1122 shows when power is applied to the radio transmitter. It is connected in series with resistor 1187 across the filament supply.

99. Overload protection is provided by fuse 1172 (Fuse FU-12-A) which is located in the positive high-voltage lead. Radio-frequency choke 1119 is used for filtering in the negative high-voltage lead. Milliammeter 1121, in the same lead, measures total plate current. Capacitor 1120 serves as plate supply filter.

100. Resistor 1196 is used to adjust the filament potentials to 10 volts as indicated by the white blocking on voltmeter 1133. The midtap of this resistor is connected to the power source. One side of the resistor is used for the adjustment of the filaments of the tubes used for CW operation and the other side for the modulator tubes. Provision is made to short out a section of the CW filament resistor by means of switch 1141 (b) to compensate for the increased line drop which occurs when the modulator filaments are lighted. This arrangement makes it unnecessary to readjust the voltages when changing from CW to TONE or VOICE. A portion of the resistor may be short-circuited by the 24/28 V. switch 1190 so that correct filament voltage may be applied both when the power-supply storage battery is being charged (terminal voltage approximately 28.0 volts) and when not being charged (terminal voltage 24 volts). Switch 1135 connects filament voltmeter 1133 to either the CW or MOD. filaments.

VACUUM TUBES

101. Tube VT-4-C is a triode with a directly heated thoriated filament, which provides large emission with low expenditure of filament energy. Connections for the grid, plate, and filament are brought through the tube base. This tube has a manufacturer's rating of 100 watts maximum plate dissipation. Characteristic curves of Tube VT-4-C are shown in Fig. 17. The following table gives the

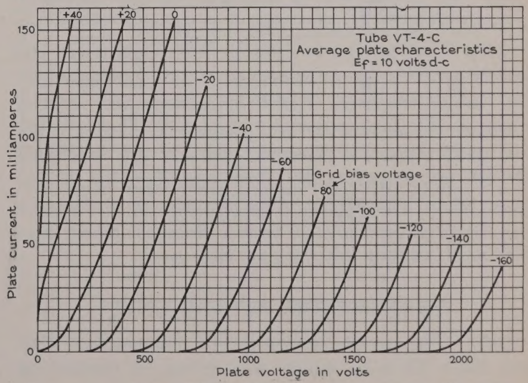


FIG. 17. TUBE VT-4-C, CHARACTERISTIC CURVES

constants of typical tubes as used in this radio transmitter.

Filament voltage	10 volts
Filament current	3.25 amperes
Plate current (max.)	0.175 ampere
Amplification factor	12
Plate resistance	3400 ohms
Plate voltage	1000 volts

Note: Tube VT-4-C has a definitely specified limit to secondary emission and is therefore a better oscillator and amplifier than Tube VT-4-B.

102. Tube VT-25 is a triode with a directly heated filament. The grid, plate and filament leads are brought out through the tube base. This tube functions in this radio transmitter as a speech amplifier or audio oscillator. The following table gives the constants of typical tubes as used in this radio transmitter:

Filament voltage	7.5 volts
Filament current	1.25 amperes
Grid voltage	−35 volts
Plate current	0.019 ampere
Amplification factor	8
Plate resistance	5000 ohms
Plate voltage	425 volts

103. Characteristic curves of Tube VT-25 are shown in Fig. 18.

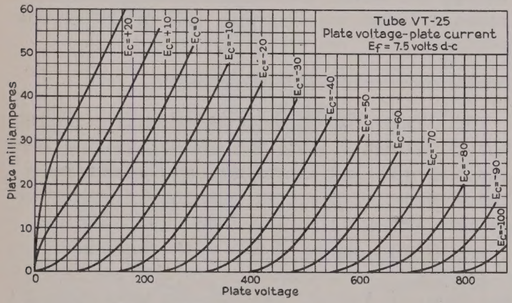


Fig. 18. Tube VT-25, Characteristic Curves

104. For normal continuous-wave operation, the speech-amplifier, master-oscillator, and power-amplifier tubes are used. For VOICE and also TONE modulated continuous-wave operation, all five tubes are used. Separate filament resistors are employed for the master-oscillator, power-amplifier and modulator tubes. This obviates the necessity of readjusting the filament voltage each time a change is made from CW to TONE or VOICE and vice versa.

TRANSMITTER TUNING UNITS

105. The circuit description of Transmitter Tuning Unit TU-8-A, which was given in connection with the description of the radio transmitter, is applicable to Transmitter Tuning Units TU-7-A and TU-9-A. The circuit of the TU-10-A is practically the same as that of the TU-8-A, the m-o plate bypass capacitor 1009 and plate choke 1010 being added. For a schematic diagram of all transmitter tuning units refer to Fig. 52.

106. Transmitter Tuning Unit TU-6-A is very similar to the TU-8-A. The same type of m-o circuit is used. However, the frequency range of this tuning unit is covered in two bands. Band change switches 602 and 622, control A, connect fixed capacitors 603 and 623 in the m-o and p-a circuits respectively to cover the low-frequency end of the band. Capacitor 603 in the m-o circuit is provided with a thermometal compensator 613 to provide the required frequency stability. Resistor 614 is the p-a grid parasitic resistor.

107. The frequency range of Transmitter Tuning Unit TU-5-A is covered by four frequency bands controlled by switches 502 and 522, control A. The type of circuit and thermal frequency compensation is the same as that in the units previously described. Resistor 517 is the p-a grid parasitic resistor.

108. Transmitter Tuning Unit TU-4-A also employs the same series feed type of circuit, tuned by means of variable and fixed capacitors. The m-o tank coil 401 is not thermally compensated. Variable capacitor 407 is compensated by means of a thermoplate, and fixed capacitors 403, 404, 405 and 406 are compensated by means of thermometal compensators 417, 418, 419, and 420. Resistor 413 is the m-o grid parasitic resistor. 415 is the m-o plate choke.

109. Transmitter Tuning Units TU-1-A, TU-2-A, TU-3-A, and TU-22-A include the same circuits, type of control and thermal frequency compensation. They differ only in frequency range and circuit parts. A description of Transmitter Tuning Unit TU-1-A will therefore be applicable to all these tuning units. The tapped variometer 101, with the voltage dividing network capacitors 110, 111, 112, 113, 114, and 115, comprises the basic m-o tank. The band change switch 107, control A, selects the proper taps on the variometer and connects the additional tank capacitors 108 and 109 into the circuit so as to properly cover the frequency range. The thermal compensators 105, 119 and 120 consist of small capacitors with a special ceramic dielectric designed to provide the required thermal frequency stability. 102 and 103 are the m-o plate and grid chokes respectively. 104 is the m-o grid blocking capacitor. Resistor 117 is located in the m-o grid circuit to suppress parasitic oscillations. Excitation for the p.a. is obtained across capacitor 114 through blocking capacitors 118. 106 is the p-a grid choke. The p-a tank is tuned by means of the tapped variometer 121 and fixed capacitors 123, 124, 125 and 126. Switch 122, ganged with 107 to control A, selects

the proper variometer tap and condenser arrangement for the desired frequency. The voltage required to neutralize the power amplifier is obtained across capacitor 113 through neutralizing capacitor 116. Coil 127 and switch 128, control D, provide the necessary coupling to the antenna circuit.

110. To obtain the high degree of frequency stability required in this equipment, the blocking and coupling capacitors used in all tuning units are of an improved high stability type. Relative to Transmitter Tuning Units TU-5-A to TU-10-A inclusive, the master-oscillator tank coils are tension wound and the variable tank capacitors are specially constructed of invar to provide a lower and more uniform temperature coefficient.

ANTENNA TUNING UNIT BC-306-A

111. This antenna tuning unit, Fig. 19, consists of tapped variometer 1502 which furnishes inductive loading reactance for series resonating the highly capacitive antennas used with Transmitter Tuning Units TU-1-A, TU-2-A, TU-3-A, and TU-22-A i.e. 150 kc to 800 kc. The varying amounts of reactance used are adjusted by the variable rotor, control F, and the tap switch 1501, control E. It will be noted that the tap switch is made up of three parts. This construction permits a total disconnection of the tuning unit when control E is on tap 1. It also permits the efficient use of a small portion of the inductance on taps 2 and 3 without excessive loss from a large unused section being connected to the circuit.

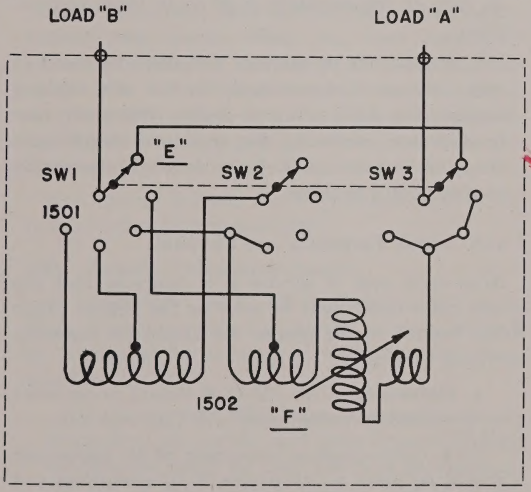


Fig. 19. Antenna Tuning Unit BC-306-A, Schematic Diagram

DYNAMOTOR UNIT PE-73-B

112. The function of Dynamotor Unit PE-73-B (Fig. 20) is to provide high voltage for the vacuum tube plates. The dynamotor derives its power from a 24/28 volt d-c source, such as a storage battery. The complete dynamotor unit consists of the dynamotor proper together with its fuses, starting relay, terminal board, bypass capacitors, and sockets for connection to the radio transmitter unit. Spare fuse links, a spare high-voltage fuse, and a small hexagon servicing wrench are attached to the cover of the fuse box.

113. The dynamotor is started by ON–OFF switch 1194 on the front panel of the radio transmitter. This switch energizes starting relay 1610 which closes and applies the input voltage to the motor end of dynamotor 1612 through the protecting fuse 1605. This also permits current to flow through fuse 1604 to the transmitter filament and control circuits. Capacitors 1607 and 1609 bypass to ground any radio-frequency interference which may be generated by the dynamotor brushes. Sockets SO-39 and SO-41 contain all high and low-voltage leads which are to be connected to the transmitter. Fuse 1605 (Fuse FU-22) which protects the low-voltage circuits from overloads is of a type known as "Superlag", and is designed to permit heavy starting surges of short duration, though prolonged overload current will cause the fuse to open.

114. Protection of the high-voltage circuit and of the dynamotor winding is obtained by fuse 1608 (Fuse FU-12-A) which is of the flame-proof type.

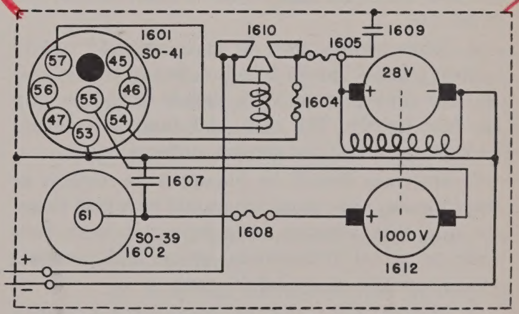


Fig. 20. Dynamotor Unit PE-73-B, Schematic Diagram

IV. MAINTENANCE

INSPECTION

115. The inspection of installed radio equipment is covered by various Air Corps Circulars and Technical Orders. Instructions contained in those Circulars and Technical Orders shall govern over any instructions contained herein. The following instructions are meant to cover, in detail, the points of inspection which are applicable to this particular equipment. The times at which the various inspections are to be made shall be governed by the applicable Circulars and Technical Orders.

116. *Daily Operating Inspection*

In order that a quick check on the condition of the transmitting equipment may be made prior to each day's flight, the following procedure is recommended.

a. Determine that the storage battery is at the proper gravity and that the charging generator and regulator are adjusted so as to keep the battery fully charged.

b. Make certain that all safety wiring is in place, that all mounting brackets and supports are rigidly fastened and that all nuts and machine screws are supplied with lockwashers and are tight.

c. Determine that no cords have broken shielding and that all grounding and bonding is in place.

d. Inspect plugs for proper fit and plug sockets for compressed pin springs. Compressed pin springs, which have taken a permanent set, can be restored by a light hammer blow on the end of the pin.

e. Make certain that all fuses are held tightly in their clips. A loosely held fuse should be removed and the clips bent with the fingers until they grip the fuse tightly. The clips and fuse ends should be kept clean and the contact surfaces bright.

f. Antennas should be inspected for broken or frayed leads, and insulators should be wiped clean. Be sure that antenna leads have not been bent close to metal frameworks where high antenna voltages might cause spark-overs.

g. Inspect keys and microphones for broken cords and deformed plugs.

h. With the airplane outdoors, check the operation on C.W., Tone, and Voice. Check the setting of all controls against the calibration charts and, if possible, check the operating frequency by means of an accurate frequency meter. Check the quality of voice transmission by listening in at some suitable receiving station.

i. If the operation of the transmitter indicates that any vacuum tube is defective, that tube should be replaced by a tube that is known to be good. If either the M.O. or P.A. tube is replaced the operating frequency should be rechecked and the M.O. Calibration reset as described in paragraph 43 f.

117. *Maintenance Inspection*

At the time specified for this type of inspection, the following inspection and cleaning should be given.

a. Clean accumulated dust and dirt from all units. Use an air hose or bellows, paying particular attention to the loading coil, item 1170, in the antenna compartment of the radio transmitter. At this time inspect the rotating coil, in this compartment. The winding should be thoroughly cleaned with carbon tetrachloride (Carbona) and a clean cloth.

b. Inspect dynamotor brushes for length. Detailed instructions on care of brushes are given herein.

c. Inspect both dynamotor commutators for cleanliness and excessive wear. Information on care of commutators is given in these instructions.

d. Rotate the dynamotor armature by hand to make certain it turns freely and is not rubbing against the field poles or leads. When all four brushes are removed, the armature should spin freely on its bearings. Refer to detailed information on dynamotor bearings.

118. *Yearly Inspection and Overhaul*

After each year of service it is desirable that the entire radio equipment be sent to the Signal Corps Radio Section of the proper Air Depot for complete overhaul as follows:

a. Dynamotor Unit PE-73-B should be serviced as described in paragraphs 119, 120, and 135.

b. A very complete inspection of all equipment should be made to determine if all assemblies and connections are tight and properly cleaned.

c. The contacts of all switches (except enclosed switches) should be cleaned with Carbona and a light film of white vaseline applied to the rubbing surfaces.

d. All working parts of the equipment should be lubricated as described in paragraphs 119, 120, and 121.

e. The electrical performance of the complete equipment should be very thoroughly checked. These checks should include voltage, current and power measurements and an overall test of modulation.

f. Inspect the wire horn gap on the back of the output terminal board. The setting on this gap for all radio transmitters using frequencies below 1500 kilocycles is 0.171 inch. Adjustment should be made with the fingers in order that the wire remain smooth and free from nicks.

LUBRICATION

119. *Lubricants*

The lubrication of the equipment involves the use of three lubricants and one cleaning solvent. These are:

a. Light Oil: A high-grade, low pour test, mineral oil with viscosity rating SAE10.

b. Light Oil: A high-grade, low pour test, mineral oil with viscosity rating SAE20.

c. Grease: Use only high-temperature ball bearing grease such as Grade 295 Air Corps Specification No. 3560. "Refined Calol Grease" as manufactured by the New Departure Mfg. Co., Bristol, Conn., or N. Y. & N. J. Lubricant No. 1572 meets the requirements of the above specification. "Calol" is a stiff, pale yellow, high flow point, sodium base grease which has been developed particularly for ball bearing applications of this nature. Do not use unauthorized greases as they may melt out at high temperatures or may oxidize rapidly and become gummy when packed in the bearings.

d. Cleaning Solvent: Carbon tetrachloride (Carbona) is strongly recommended.

120. *Periodic Lubrication Routine*

a. *Dynamotor Unit PE-73-B*. Under normal operating conditions, the dynamotor bearings should be lubricated in accordance with the following schedule:

(1) After every 1000 hours of operation or at intervals of six months, add three drops of SAE20 oil into the small oil hole which is provided in the top of each bearing housing and is closed by a screw plug. Start the threads on this plug by hand in order not to cross thread the screw plug.

(2) After every 5000 hours of operation or at intervals of one year, add approximately 0.05 cu. in. (3/8 in. cube) of ball bearing grease to each bearing through the oil hole mentioned above.

Note: Do not add more oil or grease than specified above, since the excess lubricant will tend to work out of the bearing housing onto the commutators and brushes where it will cause trouble if not wiped off. Too much grease in the bearing will have a tendency to churn and may cause the bearing to overheat. Always make certain that the lubricants used are clean and that no dirt, moisture or foreign matter enters the oil hole when lubricant is added. Tighten screw plugs securely into the oil holes as soon as lubricant is added.

(3) After every 10,000 hours of operation or at least every two years, remove the armature from the dynamotor, thoroughly clean the bearings and bearing housings with carbon tetrachloride and repack each ball bearing level full of approved ball bearing grease. See procedure for disassembly and cleaning of bearings.

b. *Reel RL-30-B*. The construction of this unit is such that it will require very little attention. The following lubrication routine is recommended to obtain the best operating results:

(1) After every 40 hours of flying time apply six drops of SAE10 oil at the oil hole indicated on the hub nameplate.

(2) After every 1000 hours of flying time or every six months, whichever comes first, do as follows:

(a) Remove the three fillister head screws which hold the crank handle lever to the hub and remove the crank.

(b) Remove the small cotter pin and castle nut on the end of the reel shaft.

(c) Remove reel spool and hub from the shaft.

(d) Clean the accumulated dirt from reel shaft and the parts in the mounting base. Examine the exterior parts of the reel hub and clean off all dirt.

(e) Lubricate these points using SAE10 oil:

[1] Counter gear shaft bearing—1 drop.

[2] Main shaft—several drops along the bearing surfaces.

[3] Rear ball bearing on hub adjacent to ratchet teeth—5 drops.

[4] Front thrust bearing around the edge of the retaining nut at the front end of the hub—5 drops.

[5] Front ball bearing around the gap between the outside of the hub and the edge of the piece into which the three screws from the crank handle lever are threaded—5 drops.

(f) Reassemble the reel as follows:

[1] Place the reel spool and hub on the shaft. Give the spool a slight spin clockwise until the ratchet engages the pawls.

[2] Replace the castle nut with the fingers, run it down until snug and then back it off until the hub runs free (at least 1/6 of a turn). Replace the cotter pin.

[3] Assemble the crank handle and tighten the three fillister head screws.

[4] This completes the operation of servicing the reel.

121. *Miscellaneous Lubrication*

The following miscellaneous lubrication instructions should be followed in connection with the maintenance of other units of the transmitting equipment. Places to oil and grease are listed. Do this after every 500 hours of service or at least after every 1000 hours. Do it oftener if dirt accumulation is excessive. Clean parts as required.

a. Oil SAE10—Ball bearings in antenna switching relay of radio transmitter unit.

b. Oil SAE20—Switch shafts in radio transmitter, transmitter tuning units and antenna tuning unit. Vernier mechanisms in radio transmitter, transmitter tuning unit and antenna tuning unit. Variable capacitor shafts in radio transmitter and transmitter tuning units.

c. Grease—Contacts of switches, and switch positioning devices in radio transmitter, transmitter tuning unit and antenna tuning unit.

d. NEVER lubricate the contact roller or the contact roller shaft of the rotating antenna inductor. These parts should run DRY and should always be kept spotlessly clean. Carbon tetrachloride (Carbona) should be used to clean these parts.

SERVICE NOTES

122. In the servicing and locating of faults in the radio transmitter and associated equipment, it is necessary to remove various shields and covers to make the circuits accessible. Great care must be taken in testing with shields removed, because a great many points of high voltage are thus exposed. Whenever such testing is necessary, the proper procedure is to remove all power from the equipment, make the necessary circuit changes or meter connections and then apply power, keeping clear of all meters which are connected in the "high" sides of circuits where there may exist an appreciable voltage to ground.

123. ALWAYS REMEMBER THAT WHEN THE DYNAMOTOR IS RUNNING AND THE TRANSMITTING KEY IS OPEN, HIGH VOLTAGE IS PRESENT IN THE RADIO TRANSMITTER EVEN THOUGH THERE IS NO PLATE AMMETER READING.

124. In checking low voltage and filament circuits the single conductor cord with Plug PL-59 should be disconnected from the radio transmitter, thus removing the high-voltage supply.

125. The following information is supplied to aid in servicing the equipment and locating faults:

a. *Voltage Readings:* (Use the high resistance Weston Voltohmmeter of Test Set I-56-A).

(1) Low-voltage input of 24 to 28 volts, depending on the power-supply voltage, should be obtained from terminal 45 of Sockets SO-41 to ground.

(2) Speech-amplifier plate voltage of approximately 425 volts should be obtained at the plate connection of the speech-amplifier tube when the radio transmitter is on VOICE. It is recommended that a tube socket adapter be used which will allow not only readings of voltage but also all currents for Tube VT-25.

(3) Modulator bias voltage of 72 to 75 should be obtained across capacitor 1160, the positive side being at ground potential. Selector switch should be on VOICE.

(4) Speech-amplifier bias voltage of 35 to 40 should be obtained across capacitor 1144, the positive side being at ground potential. Transmitter switch should be on VOICE.

(5) Plate voltage of 1000 to 1100 volts should be obtained between terminal 61 of Socket SO-39 and ground.

(6) Keying voltage of approximately 200 volts will be obtained across resistor 1115 when keying relay 1189 is open.

(7) Using the Output Meter of Test Set I-56-A, the side-tone voltage may be measured across an 8000-ohm load resistor. With the SIDE TONE switch on position 4, 17.5 to 30 volts a.c. should be present at an audio frequency of 600 to 1200 cycles, depending on the transmitter tuning unit in use.

The SIDE TONE switch on position 1 will give 3 to 9 volts a.c. It will be generally found that the CW position will give a higher voltage than the VOICE or TONE positions.

(8) Microphone-supply voltage of 4.5 to 5.3 volts d-c. should be obtained across resistor 1145. For this test, the microphone should be in the circuit.

b. *Current Readings*

(1) Speech-amplifier plate current should be from 17 to 22 milliamperes. Adjustment of the

bias voltage to obtain this value is accomplished by potentiometer 1114 which is accessible in the tube compartment.

(2) Modulator plate current may be determined by observing the increase in total plate current reading when changing from CW to VOICE and impressing normal modulation. The modulator plate current should average 100 to 160 milliamperes for sustained tones. A greater or smaller value than this indicates that a readjustment of the input level should be made.

(3) Master-oscillator plate current can be determined on the TOTAL PLATE CURRENT meter by removing the power-amplifier and speech-amplifier tubes and placing the radio transmitter on CW. The current indicated should be from 30 to 75 milliamperes, depending on the transmitter tuning unit in use.

(4) Power-amplifier plate current may be determined by subtracting from the total plate current on CW the currents drawn by the master oscillator and speech amplifier. Its value should be from 100 to 150 milliamperes at full load.

(5) Master-oscillator grid current can be determined by connecting a d-c milliammeter in series with resistor 1109. Correct value should be from 30 to 50 milliamperes.

(6) Power-amplifier grid current can be determined by inserting a d-c milliammeter in series with resistor 1112. Correct value is from 15 to 25 milliamperes.

126. Various other circuits may be checked by referring to the schematic diagram Fig. 49. Then by referring to the various unit connection diagrams, the location of the various circuit elements may be ascertained.

127. *Typical Dynamotor Performance.* The dynamotor should operate approximately as follows on a load test:

Input		**Output**	
Volts	***Amperes**	**Volts**	**Milli-amperes**
28.0	5–8	1140–1160	0
28.0	14–17	1070–1090	220
28.0	20–22.5	1025–1050	350

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* The input current above includes that taken by the starting relay.

128. *Location of Faults.* If the operation of the equipment falls below normal, several simple checks listed below may be readily investigated.

Symptoms	**Probable Causes**
No filament voltage	Relay 1610 not operating when OFF-ON switch is placed in ON position. Fuse 1604 open. Normal fuse resistance is not over one ohm. Switch 1135 must be in proper position corresponding to "CW" or "MOD."
Low filament voltage	Resistor 1196 not adjusted properly. High resistance leads between dynamotor unit and transmitter. There should be at least 20 volts at terminals 47 and 54 of Socket SO-41, item 1126. Low input voltage to dynamotor.
Key relay inactive	Key jack not making good contact. Cord open. Energizing coil open.
No plate current	Fuse 1608 in dynamotor unit or fuse 1172 in transmitter open. Normal fuse resistance not over 3 ohms. Filaments not lighted. Key relay inactive.
Excessive plate current (No antenna load—CW)	P.A. dial "C" not in tune. M.O. tube inoperative
Excessive plate current (antenna loaded—CW)	Coupling tap "D" on too high a number. On some tuning units, or with low resistances, it may be necessary to detune the antenna to secure 220 ma on CW. *Always maintain the PA dial "C" in tune.*

Symptoms (Continued)	Probable Causes (Continued)
No antenna current	Antenna circuit open. Antenna not properly tuned. Link not in Terminal Board A to B.
No side tone (Tone—CW)	Tube VT-25 defective. S.A. BIAS control not set properly. The correct setting will usually be found between 6.0 and 7.5 on the dial.
No or low side tone (Voice)	Same as above. Adjustment may be too low. Operator may need to adjust side-tone level to a higher number than for Tone or CW, especially if a low-level voice is used.

129. Troubles of a more complex nature will require analysis with Test Set I-56-A or equivalent. Methods of procedure for some of the more probable troubles are listed below. Operating personnel are warned to use extreme caution in avoiding accidental contact with high voltage parts while making the following tests. ALWAYS REMEMBER THAT WHEN THE DYNAMOTOR IS RUNNING AND THE TRANSMITTING KEY IS OPEN, HIGH VOLTAGE IS PRESENT IN THE TRANSMITTER EVEN THOUGH THERE IS NO PLATE AMMETER READING.

Fault	Test Procedure
Dynamotor won't run	Test fuse 1605 (Fuse FU-22) and check voltage (24 or 28) at line input terminals. Remove end bells and disconnect input voltage. Then rotate armature. If armature does not rotate freely, follow instructions for dynamotor under "LUBRICATION." If the dynamotor armature turns freely, connect input voltage again and short pin No. 57 of Socket SO-41 to ground. If machine now runs, look for open lead in cord to transmitter. Check to see if tuning unit is firmly in place and interlock 1102 is closed. If dynamotor does not run when pin No. 57 of Socket SO-41 is grounded, listen for click of starting relay 1610 and check voltage across its terminals. 24 to 28 volts should exist with pin No. 57 grounded. If dynamotor starts to rotate then stops as Fuse FU-22 blows, replace the single link in Fuse FU-22 with two links (Fuse Link M-168) in parallel. The instantaneous line current sometimes overheats the fuse on input lines of good regulation while normal running currents would be satisfactory. With the input power off, the large relay terminals may be shorted and the dynamotor circuits checked for continuity to the brushes. CAUTION: Replace all dynamotor brushes in the same holder with the marking up, exactly as removed. The brushes have been accurately fitted and run-in exactly as shipped. A very slight difference between brush holders will cut the effective brush contact area considerably. This will lower the dynamotor efficiency. If after these tests, the dynamotor will not operate, first try a substitute dynamotor if available, then ship the defective unit to the Signal Corps Radio Section of an Air Depot for servicing.
P.A. TUNING control "C" has no effect on total plate current	First, reduce the ANT. COUPLING control "D" to a minimum; switch position 1. If this has no effect, examine and replace the m-o tube. Be sure transmitter is on the "CW" position as this entire fault may be caused by an improperly tuned power-amplifier tube and misadjusted modulator tubes when operating in the "VOICE" position. Measure the voltage from the junction of 1111 and 1112 to ground. If the master oscillator is functioning properly, this voltage should be approximately 200 V. d.c. key down. Should this voltage be near zero, check the voltages on the master-oscillator tube and continuity of the p-a grid circuits.

Fault (Continued)	Test Procedure (Continued)
P.A. TUNING control "C" has no effect on total plate current (*Continued*)	The master-oscillator tube may be checked for operation by holding a neon bulb in the hand in contact with the glass of the master-oscillator tube. If the m-o tube is oscillating, the neon tube will glow. By substitution of tuning units, one may determine if the trouble is peculiar to the tuning unit or to the radio transmitter. If the trouble is in the tuning unit, remove the cover and check continuity of all circuits. Look for chips and shorted turns on the tank coils, dirty condensers and open choke coils. Condenser plates may be effectively cleaned with pipe cleaners. If the unit is to be blown out, be sure to use clean dry air.
Radio transmitter sparks over at high altitudes	Read instructions on high altitude operation under section II, EMPLOYMENT. If the radio transmitter does not meet the altitude operation stated in the above section, the radio transmitter must be thoroughly checked over. Tuning units must be blown clean and capacitors wiped plate by plate with a pipe cleaner. The master-oscillator and power-amplifier tubes should be changed. The air gap on the back of the output terminal board must be set for 0.171 inch. Wipe the key relay posts and output terminal board with a clean dry lintless cloth. Inspect antenna compartment for clearances of the wiring. All wires should be spaced clear from ground. Compare the faulty transmitter antenna compartment with a normal unit.
No modulation on VOICE	Check the Tone-CW-Voice selector switch for position. Substitute another Tube VT-25. Check that the CW carrier is properly adjusted. Check voice increase of 20 to 35 ma in total plate current over the CW value of 220 ma. If total plate current cannot be adjusted for this increase, change modulator tubes. Check continuity of circuits with all power off. Remove high voltage Plug PL-59 from radio transmitter and place the high resistance voltmeter of Test Set I-56-A across terminals 3 and 4 of transformer 1149. Speak into the microphone with the filaments lighted. The a-c voltage on a loud signal should be approximately 1 to 2 volts. This is a check of the input circuits. If no voltage is read check continuity of circuits as given in the resistance chart.
No modulation on TONE	If the CW and Voice operation is normal, one can assume that the tubes are satisfactory and the trouble lies in the fact that the speech-amplifier tube fails to oscillate. If this is the case, no side-tone will be heard on pin No. 33 of socket 1128 (SO-44) either on the CW or Tone positions. Check the S.A. BIAS control. This will usually be between 6 and 7.5 on the dial. If still no tone modulation exists, remove the dynamotor cables and check continuity of circuits, especially switch 1141.
Distortion on VOICE	Check Input Level control. The setting of this control depends on the microphone and the voice level of the operator. It will usually be found that a setting of 7 to 8 on the dial allows the total plate current to swing to 350 milliamperes on peaks of voice level, using the standard Signal Corps microphones. If the Voice modulator bias has been properly adjusted and distortion is still present, set the Input Level so that peaks of modulation are limited as shown by the total plate current swinging upward to a maximum of 300 milliamperes. If either modulator Tube VT-4-C, or the speech amplifier Tube VT-25, are defective, distortion will exist. Recheck CW first, then Voice adjustments to see if properly adjusted.

130. *Typical Readings.* The following values of voltages, currents, and settings represent average data and may vary as much as ten per cent for individual equipments. CW output is measured into a phantom antenna whose constants are similar to those in actual practice. The antenna current was measured by an external ammeter directly in series with the phantom resistor. The transmitter ammeter at the time gave current readings slightly higher because of the inherent stray capacity in the transmitter.

RADIO-FREQUENCY POWER OUTPUT

Transmitter Tuning Unit	F_{kc}	C_a (1)	A	B	C	D	E (2)	F (2)	M	N	O	P	Total I_p MA	Watts Out. (3)	Ant. Current
TU-5-A	1500	200	1	1335	43	3	. . .	. . .	12.5	4	. . .	2	205	45.0	3.0
TU-5-A	3000	200	4	2098	80	2	. . .	. . .	21.5	3	. . .	. . .	220	65.0	3.6
TU-6-A	3000	150	1	976	41	3	. . .	. . .	21.8	3	. . .	. . .	220	60.0	3.46
TU-6-A	4500	150	2	2162	86	2	. . .	. . .	12.5	3	. . .	. . .	220	55.0	3.32
TU-7-A	4500	100	. . .	419	22	2	. . .	. . .	14.5	3	. . .	2	220	60.0	3.46
TU-7-A	6200	100	. . .	2180	95	3	. . .	. . .	5.4	3	. . .	2	220	75.0	3.87
TU-8-A	6200	100	. . .	698	20	2	. . .	. . .	7.8	3	. . .	5	220	70.0	3.74
TU-8-A	7700	100	. . .	2163	84	2	. . .	. . .	4.5	3	. . .	5	220	75.0	3.87
TU-9-A	7700	100	. . .	580	23	3	. . .	. . .	4.8	3	. . .	5	220	70.0	3.74
TU-9-A	10,000	100	. . .	2169	82	2	. . .	. . .	1.0	3	. . .	5	220	75.0	3.87
TU-10-A	10,000	100	. . .	468	18	2	. . .	. . .	4.8	2	100	5	220	65.0	3.60
TU-10-A	12,500	100	. . .	2095	76	2	. . .	. . .	1.0	2	100	5	220	75.0	3.87
TU-22-A	350	400	1	770	24	1	3	54	0	3	. . .	. . .	220	45.0	3.00
TU-22-A	650	400	3	1776	67	4	1	16	0	3	. . .	. . .	220	40.0	2.83

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(1) Apparent capacity (C_a) in micromicrofarads.

(2) Where readings are not listed in columns "E" and "F." Antenna Tuning Unit BC-306-A is not used. The antenna circuit tuning given is considered the most efficient method of loading for the particular frequency used.

(3) Nominal 5-ohm phantom resistor.

131. Resistance Charts. To expedite the location of faults, the following point-to-point checks are suggested. Circuits which may be tested with a simple continuity meter (i.e., a voltmeter in series with a flashlight cell) are listed as having zero resistance. Average resistance values are tabulated and are to be tested with the Weston Voltohmmeter, Model 564, Type 3B of Test Set I-56-A. Individual radio transmitters will vary somewhat from the average values given; the maximum tolerance being approximately ten per cent.

RADIO TRANSMITTER BC-375-C

Refer to Schematic Diagram, Fig. 49. All voltages, tuning unit, and back shield removed.

Master-oscillator and Power-amplifier Circuits

	Ohms
Point 61 of Socket SO-39 (1127) to socket shell, ground	1 meg.
Point 61 of Socket SO-39 (1127) to point 2 of tuning unit plugboard	10
Point 61 of Socket SO-39 (1127) to point 2 of transformer 1164	4
Point 2 of transformer 1164 to point 8 of tuning unit plugboard	115
Point 3 of tuning unit plugboard to grid terminal of MO socket	0
Point 4 of tuning unit plugboard to terminal 55 of Socket SO-41 (1126)	7500
Point 6 of tuning unit plugboard to terminal 55 of Socket SO-41 (1126)	10,000

Modulator Circuits

Point 61 of Socket SO-39 (1127) to plate of socket 1161	70
Point 61 of Socket SO-39 (1127) to plate of socket 1162	70
Terminal 4 of transformer 1157 to grid of socket 1161	500
Terminal 4 of transformer 1157 to grid of socket 1162	500
Terminal 4 of transformer 1157 to terminal 55 of Socket SO-41 (1126)	3000 to 7000

Speech-amplifier and Side-tone Circuits

	Ohms
Side-tone switch on tap 4, orange and green wire on 1179 to ground	150
Point 61 of Socket SO-39 (1127) to terminal 2 of transformer 1157	33,000
Terminal 2 of transformer 1157 to plate of socket 1154	700
Grid of socket 1154 to terminal 3 of transformer 1149	6000
Terminal 3 of transformer 1149 to terminal 55 of Socket SO-41 (1126)	3100
Terminal 2 of transformer 1149 to ground	35
Terminal 1 of transformer 1149 to terminal 23 of Socket SO-44 (1128)	
Voice Position	0 to 200
CW or Tone Position	220

DYNAMOTOR UNIT PE-73-B

	Ohms
−L.V. input terminal to negative brush	0
−L.V. input terminal to ground	0
+L.V. brush to ground (brush removed)	25
+L.V. input terminal to terminal of 57 of Socket SO-41 (1601)	50
+L.V. brush to terminal 54 of Socket SO-41 (1601) fuses in	2
+H.V. brush to −H.V. brush	87.5

132. The transmitter tuning unit circuits are shown in Fig. 52. All circuits, not broken by a capacitor, are of low enough resistance to be checked by a continuity meter. The parasitic resistors are approximately 15 ohms and the radio-frequency chokes will have resistances between 1 and 40 ohms depending upon the tuning unit tested.

133. Various other circuits may be easily checked by reference to the values of resistances and tolerances given in section V, Supplementary Data and List of Replaceable Parts.

134. *Neutralization of Power Amplifier*

Neutralization of the power amplifier is ordinarily not necessary, since this is done when the units are tested at the manufacturer's plant. However, if the setting is disturbed for any reason, the following procedure may be used to restore the adjustment. The radio transmitter should first be set up and tuned to see that all power supplies are correct and the radio transmitter is functioning properly. Then remove the power supply cords and the back of the radio transmitter. From Connection Diagram Fig. 50 locate wire 43 (red) on filter capacitor 1163. Remove this wire with a soldering iron and tape clear of terminal on capacitor 1163. This removes the power-amplifier d-c plate voltage and leaves the r-f circuits intact. Connect the vertical plates of a cathode ray oscillograph to terminals 1 and 2 on the tuning unit panel. If one side of the oscillograph is grounded, then connect this plate to terminal 2. Tune the p.a. to resonance as shown by a maximum amplitude of r-f carrier on the oscillograph. Proceed by turning the neutralizer control, behind the tuning chart, for a minimum amplitude on the oscillograph, at the same time maintaining the p.a. in tune. When the best minimum is reached, with the p.a. in tune, the tuning unit is neutralized. In the lower frequency tuning units, the oscillograph pickup will be practically zero at neutralization, while on the higher frequencies, considerable amplitude will be noticed from stray ground currents. A check on the neutralization may be made by noticing the low reaction on the total plate meter, at neutralization, as the p.a. is tuned through resonance. The operator must remove all power plugs, while the radio transmitter back cover is removed and lead (43) is resoldered.

135. *Dynamotor Unit PE-73-B*

a. BRUSHES: The brushes can be removed by unscrewing the slotted brush cap on each side of the bearing bracket. It is recommended that each brush be suitably marked to indicate which brush holder it came from, and its relative position in that brush holder in order that the brushes may later be replaced in their original positions. THIS IS IMPORTANT. Blow out dust and clean all foreign matter from each brush holder and brush and make certain that the brushes slide freely in their brush holders, dressing the brushes with fine sandpaper, or a file, if necessary. Any brushes which have worn down to a length of less than 3/8 in. (measured from contact surface to near end of spring) should be replaced with new ones. In installing new brushes it may be necessary to "sand-in" the brush in order to make its contact surface fit the contour of the commutator. The brush must slide freely in its holder. "Sanding-in" may be accomplished by using a strip of No. 00 sandpaper about 5 in. by 1 in. for L.V. brushes and 8 in. by 5/8 in. for H.V. brushes. Wrap the strip of sandpaper around the commutator with the sand surface out. Insert the brushes in the brushholders and replace the brush caps so that the brushes are pressed tightly against the sandpaper. Holding the ends of the sandpaper so as to stretch it tightly against the commutator, rotate the armature back and forth until the full width of the brush face is making contact against the sandpaper as indicated by the sanding marks or scratches on the contact surface of the brush when it is withdrawn. Sand the sides of the brush if necessary, for a free fit in the holder. No sanding should be necessary to secure a good brush fit with the original brushes if they are replaced correctly. Never apply oil, grease or any other lubricant to the brush, commutator or brush holder. Under normal conditions of operation, it is estimated that the useful life of brushes is 2000 hours for low-voltage and 10,000 hours for high-voltage brushes.

b. COMMUTATORS: Both commutators should be wiped with a clean, lintless cloth. Any scum appearing on the low-voltage commutator should be removed by moistening the cloth in carbon tetrachloride (Carbona). The normal black or dark brown polished surface on the high-voltage commutator should not be removed. The type of brush material used in the low-voltage brushes of the dynamotor may, under certain conditions of installation, cause a discoloration of the low voltage commutator. Under these circumstances the commutator will have a mottled appearance which is caused by the formation of a very thin oxide film on the surface of the commutator bars. This film is normal and is not injurious to the commutator or brushes. Do not try to remove the oxide film described above. A rough or pitted commutator should be smoothed with No. 00 or finer sandpaper. NEVER USE EMERY CLOTH OR A FILE. Under normal conditions of operation the low-voltage and high-voltage commutators should not require turning down before 2000 hours and 10,000 hours of service, respectively. However, if the commutator bars have worn down flush with the mica, the armature should be removed from the dynamotor to turn down the commutator face and undercut the mica between bars.

c. BEARINGS: If the armature does not spin freely when rotated by hand with the brushes removed, the following may be the cause:

Dirt or other foreign matter in a bearing.

Defective ball bearing (cracked race, chipped or flattened ball).

Grease in bearing has become hard and gummy due to oxidation during long periods without actual use.

In any case, the armature should be removed from the frame as described under DISASSEMBLY and the bearings thoroughly cleaned. If, after cleaning, the outer race will not spin smoothly, it is probably due to a cracked race or chipped or flattened ball, and the defective bearing should be removed and replaced with a new one. Always use a bearing puller to remove a defective bearing and never hammer or pry the bearing off since this may bend the shaft and injure the commutator. A new bearing should be pressed on the shaft until the inner race of the bearing rests against the shoulder on the shaft. For this operation always use an arbor press and a metal cylinder or collar which bears only against the inner race of the bearing. Care must be taken that no force or stress is placed on the outer race of either bearing at any time since this will usually result in a damaged bearing.

d. DISASSEMBLY: The following procedure is recommended for disassembling the dynamotor for cleaning and repacking the bearings:

(1) Remove the three "safety-wired" screws on each end of the dynamotor and take off the two end bells.

(2) Unscrew the slotted brush cap in each brush holder and remove all four brushes. Take special care to mark the position of the brushes in their holders such that they may later be replaced in their exact original positions.

(3) Unscrew the four slotted screws located around the rim of the low-voltage bearing bracket and pry the bracket loose from the frame. The low-voltage end of the dynamotor can be identified by the long, small diameter commutator and the large copper-graphite brushes.

(4) Detach the two field leads from the terminal clamps on the low-voltage brush holders by unscrewing the screw in each terminal clamp. It is not necessary nor advisable to remove the terminal clamp from the brush holders.

(5) The bearing bracket can now be taken out of the way and the armature withdrawn from the frame. Take care not to injure the armature windings or commutator by rubbing against the field poles. Do not lose any shim washers which may be in the bearing housings, or which may stick to the bearing. If any shims are present they must be reassembled in the same housing.

(6) End Play Adjustment: A spanner screw is provided on one bearing bracket for adjusting end play in the dynamotor. This is properly adjusted at the factory and ordinarily will not need to be changed unless the armature is replaced. Before making any adjustments with this screw, it is necessary that the two setscrews on either side of the bearing be loosened. The proper adjustment is made by operating the dynamotor until it is hot (about 30 min.) then screwing the spanner screw in until the bearings begin to growl then back off about ⅛ turn (45 degrees). The setscrews should then be tightened to hold the spanner nut in position.

(7) In cleaning the ball bearings it is not necessary to remove them from the armature shaft. Simply immerse the bearing in a shallow pan of clean carbon tetrachloride and wash all of the grease from the bearing. The use of a small camel's-hair brush will greatly aid the thorough cleaning of the bearing. Change the cleaning solvent in the pan as soon as it becomes dirty. Always use clean solvent for the final rinsing of the bearings. DO NOT ALLOW THE CLEANING SOLVENT TO COME IN CONTACT WITH THE COMMUTATORS OR WINDINGS. In case the cleaning fluid is accidentally splashed on these parts, wipe it off immediately. Make certain the bearing is thoroughly clean and dry before repacking with new grease. If the bearing is not to be repacked with grease within a few minutes after cleaning, flush it with a clean, light mineral oil to protect the polished balls and races from rusting.

e. REASSEMBLY: In reassembling the dynamotor, follow in reverse order the procedure for disassembly. Make certain that the two field leads are securely attached to the proper terminal clamps on the low-voltage brush holders and that the "slack" or "loop" in these leads is "tucked" back of the field coils. Do not loosen or remove the brush holders from the bearing brackets. If a brush holder is loosened or removed for any reason, replace it securely in exactly its original position and check to make certain the contact surface of the brush fits the commutator perfectly. If necessary, sand-in the brush to secure a good fit against the commutator. When inserting the grease filler plug in the top of the bearing bracket, start the screw threads by hand before using a screwdriver. Take care not to cross thread this screw. If the screw is cross threaded, metal particles may be dropped into the bearing causing roughness and probable bearing failure.

V. SUPPLEMENTARY DATA AND LIST OF REPLACEABLE PARTS

TABLE OF REPLACEABLE PARTS

Note: A number in parenthesis after a reference number indicates that the reference covers more than one item and the quantity.

Reference No.	Stock No.	Renewal Part Designation	Name of Part	Description	Function	Drawing No. (G.E. Co.)
				RADIO TRANSMITTER BC-375-C		
1101	2C6191/S2	TSK-1	Socket	For Tube VT-4-C	M.O. Tube	Cat. 7461594 G1
1102	3Z9622	CSW-1	Switch	G.E. Cat. GA19A14 modified	Interlock	K-7870464 P1
1103	....	....	Capacitor	....	Tube Thermal Compensator	ML-7462641 G1
1104	....	....	Capacitor	Part of 1103	Calibration Reset	ML-7462641 G1
1105	3DA6-4	C-9	Capacitor	Cornell-Dubilier Type 15L, modified 0.006 mfd ±10%, 2500 volts	M.O. Plate Bypass	P-7761442 P12
1106	2C6191A/D2	RFC-14	Coil	....	M.O. Plate R.F. Choke	ML-7461859 G1
1107 (2)	3DA20-6	C-10	Capacitor	Cornell-Dubilier Type 9L, modified 0.02 mfd. ±10%, 1000 volts	P.A. Filament Bypass	P-7761443 P22
1108	3D9100-12	C-11	Capacitor	Cornell-Dubilier Type 9L, modified 0.0001 mfd. ±10%, 1000 volts	M.O. Grid Bypass	P-7761443 P23
1109 (3)	3Z6250	R-2	Resistor	IRC, Type DJ-1 (A) coating, modified 2500 ohms ±5%, 12 watts	M.O. Grid	P-7761526 P7
1110	2C6191/S2	TSK-1	Socket	For Tube VT-4-C	P.A. Tube	Cat. 7461594 G1
1111	3D9100-12	C-11	Capacitor	Cornell-Dubilier Type 9L, modified 0.0001 mfd. ±10%, 1000 volts	P.A. Grid Bypass	P-7761443 P23
1112	3Z6400-1	R-3	Resistor	IRC, Type DJ-1 (A) coating, modified 4000 ohms, ±5%, 12 watts	P.A. Grid (Fixed)	P-7761481 P10
1113	2C6191A/R31	VR-1	Resistor	Yaxley Mfg. Co. 3000 ohms +5%, −0% No taper	Mod. Bias (Variable)	K-7870710
1114	2C6191A/R31	VR-1	Resistor	Yaxley Mfg. Co. 3000 ohms, +5% −0% no taper	S.A. Bias (Variable)	K-7870710
1115	3Z6720	R-4	Resistor	IRC, Type BT-1 waxed, modified 200,000 ohms ±10%, 1 watt, red body, black end, yellow dot.	Keying	P-7761481 P27
1116 (4)	3Z6725	R-5	Resistor	IRC, Type BT-1 waxed, modified 250,000 ohms ±10%, 1 watt, red body, green end, yellow dot.	H.V. Bridge	P-7761481 P3
1117	3DA1-9	C-12	Capacitor	Cornell-Dubilier Type 15L, modified 0.001 mfd. ±5% 4500 volts	P.A. Plate, Bypass	P-7761442 P13
1118	2C6191A/D1	RFC-14	Coil	....	P.A. Plate Choke	ML-7461859 G1
1119	2C6191A/D2	RFC-15	Coil	....	H.V. Supply R.F. Choke	ML-7462675 G1
1120	2C6191A/C5	C-13	Capacitor	G.E. Model No. 9CE1A153, modified 1.0 mfd., 1200 volts DC	H.V. Filter	K-7870691 P1

RADIO TRANSMITTER BC-375-C (Continued)

Reference No.	Stock No.	Renewal Part Designation	Name of Part	Description	Function	Drawing No. (G.E. Co.)
1121	....	M-1	Ammeter IS-22	G.E. Type DW-41, 500 milliamperes DC white blocking on scale from 210 to 220 M.A.	Plate Current	ML-7875379 G2
1122	....	....	Lamp LM-27	Mazda No. 44 6.3 volts 0.25 Amp.	Pilot	....
1126	2Z8741	....	Socket SO-41	Plug Receptacle	For Plug PL-61	ML-7761424 G1
1127	2Z8739	....	Socket SO-39	Plug Receptacle	For Plug PL-59	ML-7761427 G1
1128	2Z8744	....	Socket SO-44	Plug Receptacle	For Plug PL-64	ML-7761424 G2
1129	....	J-1	Jack JK-33-A	....	Microphone and Key	ML-7461866 G1
1131	3Z9622	CSW-1	Switch	G.E. Cat. GA19A14 modified	Test Key	K-7870464 P1
1133	....	M-2	Voltmeter IS-122	G.E. Type AW-41, 15 volts AC-DC white blocking on scale at 10 volts.	Filament	ML-7875379 G3
1134	3DA10-17	C-14	Capacitor	Cornell-Dubilier Type 9L, modified 0.01 mfd. ±10%, 1000 volts	Filament Voltmeter Bypass	P-7761443 P24
1135	3Z8106	CSW-3	Switch	Hart & Hegeman Elect. Co. No. 21189, modified single circuit two way, 1 amp. 250 volts, 3 amp., 125 volts	Filament Voltmeter	K-7868750 P1
1141	3Z9625	CSW-5	Switch	....	Selector "Tone CW-Voice"	ML-7463230 G1
1142	3DA1-10	C-15	Capacitor	Cornell-Dubilier Type 9L, modified 0.001 mfd. ±10%, 2500 volts	Tone Feedback	P-7761443 P20
1144	3DB1.1A	C-16	Capacitor	Cornell-Dubilier Type HC-1010A, modified 1 mfd. ±10%, 300 volts, D.C.	S.A. Grid Bypass	K-7870639 P1
1145	3Z6005-2	R-8	Resistor	IRC Type AB-1 (A) coating, modified 50 ohms ±10%, 4 watts	Microphone	P-7761481 P11
1146	....	AFC-1	Reactor	....	Microphone Filter	P-7762353 G1
1147	2C6191A/C9	C-17	Capacitor	Cornell-Dubilier Type "A" Model MA-12658-PE, modified 25 mfd. plus 40%, minus 10%, 25 volts DC	Microphone Filter	K-7870437 P1
1148	2C6191A/R32	VR-2	Resistor	Yaxley Mfg. Co. 200 ohms ±10%, No taper	Input Level (Variable)	K-7870693 P1
1149	....	TR-1	Transformer	....	Microphone	P-7762352 G1
1150	3DA1-7	C-18	Capacitor	Cornell-Dubilier Type 9L, modified 0.001 mfd. ±5%, 2500 volts	S.A. Grid	P-7761443 P8
1151	3Z6020-4	R-9	Resistor	IRC, Type AA-1 (A) Coating, modified 200 ohms ±5%, 2 watts	Input Load	P-7761526 P10
1154	2Z8759	TSK-2	Socket	Hammarlund Mfg. Co. Type S-4, modified	S.A. Tube (VT-25)	K-7870442 P1
1155	2C6191A/C5	C-13	Capacitor	G.E. Model No. 9CE1A153 modified 1.0 mfd., 1200 volts D.C.	S.A. Plate Bypass	K-7870691 P1

RADIO TRANSMITTER BC-375-C (Continued)

Reference No.	Stock No.	Renewal Part Designation	Name of Part	Description	Function	Drawing No. (G.E. Co.)
1156 (3)	3Z6611-1	R-11	Resistor	IRC, Type DJ-1 (A) Coating, modified 11,000 ohms ±5%. 12 watts	S.A. Plate	P-7761526 P8
1157	2C6191A/T2	TR-2	Transformer		Interstage	P-7761434 G1
1160	3DB1.1A	C-16	Capacitor	Cornell-Dubilier Type HC-1010A, modified 1 mfd. ±10%, 300 volts, DC	Modulator Grid Bypass	K-7870639 P1
1161	2C6191/S2	TSK-1	Socket	For Tube VT-4-C	Modulator Tube	Cat. 7461594 G1
1162	2C6191/S2	TSK-1	Socket	For Tube VT-4-C	Modulator Tube	Cat. 7461594 G1
1163	2C6191A/C5	C-13	Capacitor	G.E. Co. Model No. 9CE1A153, modified 1.0 mfd, 1200 volts DC	Modulator Plate Bypass	K-7870691 P1
1164	2C6191A/T1	TR-3	Transformer.		Modulation	P-7761432 G1
1166		M-3	Ammeter IS-89	G.E. Type DW 44, 8 amperes R.F. with internal thermo-couple	Antenna Current	ML-7875379 G1
1167			Coil		Antenna Inductance	ML-7761938 G1
1168	3Z9626	CSW-7	Switch		Antenna Circuit	ML-7463231 G1
1169			Capacitor	Hammarlund Mfg. Co. 22 MMF to 118 MMF	Antenna Tuning (Variable)	M-7463006 P1
1170			Coil		Antenna Loading Inductance	ML-7761429 G1
1171	3Z9627	CSW-8	Switch		Antenna Loading Tap	ML-7760475 G7
1172		FU-12	Fuse FU-12-A	5 amp, 1000 volts.	Plate	Cat. 7871111 P1
1179	3Z9610A	CSW-6	Switch	Yaxley Mfg. Co. Type B-12473, modified single section, one circuit, four point, non-shorting	Sidetone	K-7870711 P1
1180	3DA10-13	C-19	Capacitor	Cornell-Dubilier Type 9L, modified 0.01 mfd. ±5%, 2500 volts	Modulator Grid (Tone)	P-7761443 P26
1181 (2)	3Z6630-4	R-12	Resistor	IRC, Type BT-1 waxed, modified 30,000 ohms ±5%, 1 watt, orange body, black end, orange dot	Modulator Grid	P-7761526 P12
1183	3Z6010-6	R-13	Resistor		M.O. Grid parasitic	ML-7871909 G1
1184	3Z6010-6		Coil	Ganged with 1183	M.O. Grid parasitic choke	ML-7871909 G1
1185	3DB1.1A	C-16	Capacitor	Cornell-Dubilier Type HC-1010A, modified, 1 mfd. ±10%, 300 volts, DC	Key Filter	K-7870639 P1
1186	3Z5995	R-14	Resistor	IRC, Type AA-1 (A) coating modified 5 ohms, ±5%, 2 watts	Key Filter	P-7761526 P16
1187		R-16	Resistor	IRC, Type DJ-1 (A) coating, modified 100 ohms, ±5%, 12 watts	Pilot Lamp	P-7762203 P20
1189		REL-4	Relay		Antenna Switching	ML-7660600 G2

RADIO TRANSMITTER BC-375-C (Continued)

Reference No.	Stock No.	Renewal Part Designation	Name of Part	Description	Function	Drawing No. (G.E. Co.)
1190	....	CSW-2	Switch	Hart & Hegeman Elect. Co. Cat. 80600, double pole, single throw. 6 amps at 250 V. 12 amps. at 125 V.	Filament	K-7874607 P1
1191	....	R-17	Resistor	IRC, Type DJ-1 (A) coating modified 5 ohms ±5%, 12 watts	S.A. Filament	P-7762203 P21
1192	....	R-17	Resistor	IRC, Type DJ-1 (A) coating modified 5 ohms, ±5%, 12 watts	S.A. Filament	P-7762203 P21
1193	....	R-18	Resistor	IRC, Type DG-1 (A) coating, modified 150 ohms, ±5%, 8 watts	Microphone	P-7762203 P22
1194	....	CSW-2	Switch	Hart & Hegeman Elect. Co., Cat. 80600, double-pole, single throw, 6 amps at 250 V. 12 amps. at 125 V.	Off-On	K-7874607 P1
1196	....	R-15	Resistor	G.E. Co. 2.70 ohms, 36 watts; and 3.70 ohms, 26 watts dissipation; blue stick resistor mounted on tapped connection board.	Filament	ML-7761699 G2

TRANSMITTER TUNING UNIT TU-5-A
(1500-3000 KC)

Reference No.	Stock No.	Renewal Part Designation	Name of Part	Description	Function	Drawing No. (G.E. Co.)
501	....	....	Inductance	....	M.O. Tank	ML-7761605 G1
502	3Z9614	CSW-9	Switch	(Ganged with 522)	M.O. Band Change	ML-7659203 G2
503	3D9100-11	C-1	Capacitor	Cornell-Dubilier Type 15H, modified 0.0001 mfd. ±2%, 3000 volts	M.O. Tank	P-7761662 P3
504	3D9100-11	C-1	Capacitor	Cornell-Dubilier Type 15H, modified 0.0001 mfd. ±2%, 3000 volts	M.O. Tank	P-7761662 P3
505	3D9100-11	C-1	Capacitor	Cornell-Dubilier Type 15H, modified 0.0001 mfd. ±2%, 3000 volts	M.O. Tank	P-7761662 P3
506	3D9030-1	C-2	Capacitor	Cornell-Dubilier Type 15H, modified 0.00003 mfd. ±5%, 2000 volts	M.O. Tank	P-7761662 P1
507	....	....	Capacitor	Hammarlund Mfg. Co. Max. 135 mmf. ±2%, Min. 20 mmf. ±1 mmf.	M.O. Tank (Variable)	P-7761569 P2
508	2C8005A/D10	RFC-1	Coil	(With resistor 517)	P.A. Grid Choke	ML-7462657 G1
509	3D9400-6	C-3	Capacitor	Cornell-Dubilier Type 9HL, modified 0.0004 mfd. ±10%, 5000 volts	P.A. Grid Blocking	P-7761663 P1
510		C-3	Capacitor	Cornell-Dubilier Type 9HL, modified 0.0004 mfd. ±10%, 5000 volts	M.O. Grid Blocking	P-7761663 P1
511	2C8005A/D11	RFC-2	Coil	....	M.O. Grid Choke	ML-7462706 G1

Reference No.	Stock No.	Renewal Part Designation	Name of Part	Description	Function	Drawing No. (G.E. Co.)
TRANSMITTER TUNING UNIT TU-5-A (Continued) (1500-3000 KC)						
512	....	....	Capacitor	Hammarlund Mfg. Co. Max. 26 mmf. ±4%, Min. 8 mmf. ±1.5 mmf.	Neutralizing	T-7660443 P8
513	....	....	Compensator	....	....	ML-7462769 G1
514	....	....	Compensator	(Ganged to 513)	....	ML-7462769 G1
515	....	....	Compensator	(Ganged to 513)	....	ML-7462769 G1
516	....	....	Compensator	(Ganged to 513)	....	ML-7462769 G1
517	3Z6001E5	RFC-1	Resistor	G.E. Co. Type QLK, 15 ohms, 4.5 watts	P.A. Parasitic	QLK-2155993 15 ohms
521	....	....	Inductance	....	P.A. Tank	ML-7761615 G1
522	3Z9614	CSW-9	Switch	(Ganged to 502)	P.A. Band Change	ML-7659203 G2
523	3D9090	C-4	Capacitor	Cornell-Dubilier Type 15L, modified 0.00009 mfd. ±5%, 3000 volts	P.A. Tank	P-7761442 P15
524	3D9090	C-4	Capacitor	Cornell-Dubilier Type 15L, modified 0.00009 mfd. ±5%, 3000 volts	P.A. Tank	P-7761442 P15
525	3D9090	C-4	Capacitor	Cornell-Dubilier Type 15L, modified 0.00009 mfd. ±5%, 3000 volts	P.A. Tank	P-7761442 P15
527	....	....	Capacitor	Hammarlund Mfg. Co. Max. 156 mmf. ±3%, Min. 20 mmf. ±1.5 mmf.	P.A. Tank (Variable)	T-7660443 P6
528	....	....	Coil	....	Antenna Coupling	ML-7462710 G1
529	3Z9605A	CSW-10	Switch	....	Antenna Coupling	Cat. 7760475 G1
TRANSMITTER TUNING UNIT TU-6-A (3000-4500 KC)						
601	....	....	Inductance	....	M.O. Tank	ML-7761606 G1
602	3Z9612	CSW-11	Switch	(Ganged with 622)	M.O. Band Change	ML-7659555 G1
603	3D9050-3	C-7	Capacitor	Cornell-Dubilier Type 15H, modified 0.00005 mfd. ±5%, 3000 volts	M.O. Tank	P-7761662 P2
607	....	....	Capacitor	Hammarlund Mfg. Co. Max. 77 mmf. ±2%, Min. 15 mmf. ±1 mmf.	M.O. Tank (Variable)	P-7761569 P3
608	2C8006A/D14	RFC-3	Coil	(With resistor 614)	P.A. Grid Choke	ML-7462659G2
609	3D9400-6	C-3	Capacitor	Cornell-Dubilier Type 9HL, modified 0.0004 mfd. ±10%, 5000 volts	P.A. Grid Blocking	P-7761663 P1
610	3D9400-6	C-3	Capacitor	Cornell-Dubilier Type 9HL, modified 0.0004 mfd. ±10%, 5000 volts	M.O. Grid Blocking	P-7761663 P1
611	2C8006A/D15	RFC-4	Coil	....	M.O. Grid Choke	ML-7462659 G1
612	....	....	Capacitor	Hammarlund Mfg. Co. Max. 26 mmf. ±4%, Min. 8 mmf. ±1.5 mmf.	Neutralizing	T-7660443 P8

Reference No.	Stock No.	Renewal Part Designation	Name of Part	Description	Function	Drawing No. (G.E. Co.)
TRANSMITTER TUNING UNIT TU-6-A (Continued) (3000-4500 KC)						
613			Compensator		M.O. Tuning	ML-7462707 G1
614	3Z6001E5	RFC-3	Resistor	G.E. Co. Type QLK, 15 ohms, 4.5 watts	P.A. Grid Parasitic	QLK-2155993 15 ohms
621			Inductance		P.A. Tank	ML-7761616 G1
622	3Z9612A	CSW-11	Switch	(Ganged with 602)	P.A. Band Change	ML-7659555 G1
623	3D9050-1	C-6	Capacitor	Cornell-Dubilier Type 15L, modified 0.00005 mfd. ±5%, 3000 volts	P.A. Fixed Tank	P-7761442 P11
627			Capacitor	Hammarlund Mfg. Co. Max. 116 mmf. ±3%, Min. 19 mmf. ±1.5 mmf.	P.A. Tank (Variable)	T-7660443 P1
628			Coil		Antenna Coupling	ML-7461825 G1
629	3Z9605A	CSW-10	Switch		Antenna Coupling	Cat. 7760475G1
TRANSMITTER TUNING UNIT TU-7-A (4500-6200 KC)						
701			Inductance		M.O. Tank	ML-7761607 G1
702			Capacitor	Hammarlund Mfg. Co. Max. 111 mmf. ±2%, Min. 23 mmf. ±1 mmf.	M.O. Tank (Variable)	P-7761569 P4
703	3D9400-6	C-3	Capacitor	Cornell-Dubilier Type 9HL, modified 0.0004 mfd. ±10%, 5000 volts	M.O. Grid Blocking	P-7761663 P1
704	2C8006A/D15	RFC-5	Coil		M.O. Grid Choke	ML-7462659 G3
705	3D9400-6	C-3	Capacitor	Cornell-Dubilier Type 9HL modified 0.0004 mfd. ±10%, 5000 volts	P.A. Grid Blocking	P-7761663 P1
706	2C8007A/D3	RFC-6	Coil		P.A. Grid Choke	ML-7462639 G1
707			Capacitor	Hammarlund Mfg. Co. Max. 26 mmf. ±4%, Min. 8 mmf. ±1.5 mmf.	Neutralizing	T-7660443 P8
721			Inductance		P.A. Tank	ML-7761617 G1
722			Capacitor	Hammarlund Mfg. Co. Max. 116 mmf. ±2.5% Min. 19 mmf. ±1.5 mmf.	P.A. Tank (Variable)	T-7660443 P2
723			Coil		Antenna Coupling	ML-7462759 G1
724	3Z9605A	CSW-10	Switch		Antenna Coupling	Cat. 7660475 G1
TRANSMITTER TUNING UNIT TU-8-A (6200-7700 KC)						
801			Inductance		M.O. Tank	ML-7761608 G1
802			Capacitor	Hammarlund Mfg. Co. Max. 66 mmf. ±2%, Min. 14 mmf. ±1 mmf.	M.O. Tank (Variable)	P-7761569 P5

TRANSMITTER TUNING UNIT TU-8-A (Continued)
(6200-7700 KC)

Reference No.	Stock No.	Renewal Part Designation	Name of Part	Description	Function	Drawing No. (G.E. Co.)
803	3D9400-6	C-3	Capacitor	Cornell-Dubilier Type 9HL, modified 0.0004 mfd. ±10%, 5000 volts	M.O. Grid Blocking	P-7761663 P1
804	2C8008A/D5	RFC-7	Coil		M.O. Grid Choke	ML-7462638 G1
805	3D9400-6	C-3	Capacitor	Cornell-Dubilier Type 9HL, modified 0.0004 mfd. ±10%, 5000 volts	P.A. Grid Blocking	P-7761663 P1
806	2C8008A/D12	RFC-8	Coil		P.A. Grid Choke	ML-7462658 G1
807			Capacitor	Hammarlund Mfg. Co. Max. 26 mmf. ±4%, Min. 8 mmf. ±1.5 mmf.	Neutralizing	T-7660443 P8
821			Inductance		P.A. Tank	ML-7761618 G1
822			Capacitor	Hammarlund Mfg. Co. Max. 81 mmf. ±3%, Min. 15 mmf. ±1.5 mmf.	P.A. Tank (Variable)	T-7660443 P7
823			Coil		Antenna Coupling	ML-7462672 G1
824	3Z9605A	CSW-10	Switch		Antenna Coupling	Cat. 7760475 G1

TRANSMITTER TUNING UNIT TU-9-A
(7700-10,000 KC)

Reference No.	Stock No.	Renewal Part Designation	Name of Part	Description	Function	Drawing No. (G.E. Co.)
901			Inductance		M.O. Tank	ML-7761609 G1
902			Capacitor	Hammarlund Mfg. Co. Max. 77 mmf. ±2%, Min. 15 mmf. ±1 mmf.	M.O. Tank (Variable)	P-7761569 P6
903	3D9400-6	C-3	Capacitor	Cornell-Dubilier Type 9HL, modified 0.0004 mfd. ±10%, 5000 volts	M.O. Grid Blocking	P-7761663 P1
904	2C8009A/D6	RFC-9	Coil		M.O. Grid Choke	ML-7462662 G1
905	3D9400-6	C-3	Capacitor	Cornell-Dubilier Type 9HL, modified 0.0004 mfd. ±10%, 5000 volts	P.A. Grid Blocking	P-7761663 P1
906	2C8009A/D7	RFC-10	Coil		P.A. Grid Choke	ML-7463044 G1
907			Capacitor	Hammarlund Mfg. Co. Max. 26 mmf. ±4%, Min. 8 mmf. ±1.5 mmf.	Neutralizing	T-7660443 P8
909	3D9400-3	C-8	Capacitor	Cornell-Dubilier Type 9L, modified 0.0004 mfd. ±5%, 5000 volts	M.O. Bypass	P-7761443 P2
921			Inductance		P.A. Tank	ML-7761619 G1
922			Capacitor	Hammarlund Mfg. Co. Max. 116 mmf. ±2.5%, Min. 19 mmf. ±1.5 mmf.	P.A. Tank (Variable)	T-7660443 P3
923			Coil		Antenna Coupling	ML-7462770 G1
924	3Z9605A	CSW-10	Switch		Antenna Coupling	Cat. 7760475 G1

Reference No.	Stock No.	Renewal Part Designation	Name of Part	Description	Function	Drawing No. (G.E. Co.)
TRANSMITTER TUNING UNIT TU-10-A (10,000-12,500 KC)						
1001			Inductance		M.O. Tank	ML-7761610 G1
1002			Capacitor	Hammarlund Mfg. Co. Max. 62 mmf. ±2%, Min. 14 mmf. ±1 mmf.	M.O. Tank (Variable)	P-7761569 P7
1003	3D9400-6	C-3	Capacitor	Cornell-Dubilier Type 9HL, modified 0.0004 mfd. ±10%, 5000 volts	M.O. Grid Blocking	P-7761663 P1
1004	2C8010A/D7	RFC-11	Coil		M.O. Grid Choke	ML-7462661 G1
1005	3D9400-6	C-3	Capacitor	Cornell-Dubilier Type 9HL, modified 0.0004 mfd. ±10%, 5000 volts	P.A. Grid Blocking	P-7761663 P1
1006	2C8010A/D8	RFC-12	Coil		P.A. Grid Choke	ML-7463045 G1
1007			Capacitor	Hammarlund Mfg. Co. Max. 26 mmf. ±4%, Min. 8 mmf. ±1.5 mmf.	Neutralizing	T-7660443 P8
1009	3D9400-3	C-8	Capacitor	Cornell-Dubilier Type 9L, modified 0.0004 mfd. ±5% 5000 volts	M.O. Bypass	P-7761443 P2
1010	2C8010A/D16	RFC-13	Coil		M.O. Choke	ML-7462679 G1
1021			Inductance		P.A. Tank	ML-7761620 G1
1022			Capacitor	Hammarlund Mfg. Co. Max. 116 mmf. ±2.5%, Min. 19 mmf. ±1.5 mmf.	P.A. Tank (Variable)	T-7660443 P4
1023			Coil		Antenna Coupling	ML-7462755 G1
1024	3Z9605A	CSW-10	Switch		Antenna Coupling	Cat. 7760475 G1
TRANSMITTER TUNING UNIT TU-22-A (350-650 KC)						
2201			Variometer		M.O. Tank	ML-7761803 G3
2202		RFC-16	Coil		M.O. Plate Choke	ML-7463139 G1
2203		RFC-17	Coil	(With Resistor 2217)	M.O. Grid Choke	ML-7463144 G2
2204		C-21	Capacitor	Cornell-Dubilier Type 9HL, modified 0.002 mfd. ±10%, 5000 volts	M.O. Grid Blocking	P-7761663 P2
2205			Compensator			K-7872696
2206		RFC-18	Coil		P.A. Grid Choke	ML-7463142 G1
2207		CSW-13	Switch	(Ganged with 2222)	M.O. Band Change	ML-7659203 G3
2208		C-22	Capacitor	Cornell-Dubilier Type 15H, modified 0.0001 mfd. ±2%, 3000 volts	M.O. Tank	K-7872594 P3
2209		C-23	Capacitor	Cornell-Dubilier Type 15H, modified 0.0002 mfd. ±5%, 3000 volts	M.O. Tank	K-7872594 P4
2210		C-24	Capacitor	Cornell-Dubilier Type 9HL, modified 0.003 mfd. ±5%, 5000 volts	M.O. Chain	P-7761663 P3

TRANSMITTER TUNING UNIT TU-22-A (Continued)
(350-650 KC)

Reference No.	Stock No.	Renewal Part Designation	Name of Part	Description	Function	Drawing No. (G.E. Co.)
2211	....	C-24	Capacitor	Cornell-Dubilier Type 9HL, modified 0.003 mfd. ±5%, 5000 volts.	M.O. Chain	P-7761663 P3
2212	....	C-25	Capacitor	Cornell-Dubilier Type 9HL, modified 0.0035 mfd. ±5%, 5000 volts	M.O. Chain	P-7761663 P15
2213	....	C-26	Capacitor	Cornell-Dubilier Type 9HL, modified 0.0024 mfd. ±5%, 5000 volts	M.O. Chain	P-7761663 P16
2214	....	C-26	Capacitor	Cornell-Dubilier Type 9HL, modified 0.0024 mfd. ±5%, 5000 volts	M.O. Chain	P-7761663 P16
2215	....	C-25	Capacitor	Cornell-Dubilier Type 9HL, modified 0.0035 mfd. ±5%, 5000 volts	M.O. Chain	P-7761663 P15
2216	....	....	Capacitor	Hammarlund Mfg. Co. Max. 26 mmf. ±4%, Min. 8 mmf. ±1.5 mmf.	Neutralizing	T-7660443 P8
2217	....	RFC-17	Resistor	G.E. Type QLK 15 ohms, 4.5 watts	P.A. Grid Parasitic	QLK-2155993 15 ohms
2218	....	C-21	Capacitor	Cornell-Dubilier Type 9HL, modified 0.002 mfd. ±10%, 5000 volts	P.A. Grid	P-7761663 P2
2219	....	....	Compensator	....	....	K-7872696
2220	....	....	Compensator	....	....	K-7875316
2221	....	....	Variometer	....	P.A. Tank	ML-7761804 G2
2222	....	CSW-13	Switch	(Ganged with 2207)	P.A. Band Change	ML-7659203 G3
2223	....	C-27	Capacitor	Cornell-Dubilier Type 15L, modified 0.0001 mfd. ±5%, 3000 volts	P.A. Tank	P-7761442 P9
2224	....	C-28	Capacitor	Cornell-Dubilier Type 15L, modified 0.0002 mfd. ±5%, 3000 volts	P.A. Tank	P-7761442 P8
2225	....	C-29	Capacitor	Cornell-Dubilier Type 15L, modified 0.0008 mfd. ±5%, 3000 volts	P.A. Tank	P-7761442 P17
2227	....	....	Coil	....	Antenna Coupling	ML-7463895 G1
2228	....	CSW-14	Switch	....	Antenna Coupling	Cat. 7760475 G8
2229	....	C-30	Capacitor	Cornell-Dubilier Type 9L, modified 0.002 mfd. ±2%, 5000 volts	Antenna Coupling	P-7761443 P27

ANTENNA TUNING UNIT BC-306-A

Reference No.	Stock No.	Renewal Part Designation	Name of Part	Description	Function	Drawing No. (G.E. Co.)
1501	....	CSW-12	Switch	....	Antenna Variometer	ML-7463975 G1
1502	....	....	Variometer	....	Antenna Tuning	ML-7761714 G1

Reference No.	Stock No.	Renewal Part Designation	Name of Part	Description	Function	Drawing No. (G.E. Co.)
DYNAMOTOR UNIT PE-73-B						
1601	2Z8741	....	Socket SO-41	Plug Receptacle	For Plug PL-61	ML-7761424 G1 Signal Corps Dwg. No. SC-D-457
1602	2Z8739	....	Socket SO-39	Plug Receptacle	For Plug PL-59	ML-7761427 G1 Signal Corps Dwg. SC-D-457
1604	3Z1913	FU-13	Fuse FU-13	G.E. Fuse No. GE-1027, modified, 30 amps, 250 volts	Transmitter L.V. Supply	K-7870616 P1
1605	3Z1922	FU-22	Fuse FU-22	Bussmann Mfg. Co. No. 1021, modified, 60 amps. 250 volts	Dynamotor L.V.	K-7870604 P1
1607	3DA5	C-20	Capacitor	Cornell-Dubilier Type 9L, modified, 0.005 mfd ±5%, 5000 volts	H.V. Filter	P-7761443 P6
1608	3Z1918	FU-18	Fuse FU-18-A	G.E. Fuse 78X159 modified, 1 amp. 1000 volts	Dynamotor H.V.	K-7870617 P1
1609	3DA10-17	C-14	Capacitor	Cornell-Dubilier Type 9L, modified 0.01 mfd. ±10%, 1000 volts.	L. V. Filter	P-7761443 P24
1610	....	REL-3	Relay	G.E. Cat. CR-2800-384A3 Nominal Coil Voltage 24 Volts, D.C.	Starting	M-7464026 P3
1612	....	....	Dynamotor	G.E. Model List 5D48B5A, modified 28/1000 volts Max. 6000 rpm	H.V. Power Supply	K-7875900
MOUNTINGS						
....	....	FT-107	Mounting FT-107	....	For use with Dynamotor Unit PE-73-B	ML-7461031 G1 Signal Corps Dwg. SC-D-447
....	....	FT-115	Mounting FT-115-B	....	Disposable; for use with Radio Transmitter BC-375-C	ML-7463135 G1 Signal Corps Dwg. SC-D-2286
....	....	FT-142	Mounting FT-142	....	For use with Antenna Tuning Unit BC-306-A	ML-7462801 G1 Signal Corps Dwg. SC-D-2389
....	2Z6691A	FT-151	Mounting FT-151-A	....	For use with Radio Transmitter BC-375-C	ML-7761671 G1 Signal Corps Dwg. SC-D-2290

THE FOLLOWING ITEMS OF THE SAME TYPE ARE ELECTRICALLY AND MECHANICALLY INTERCHANGEABLE

Description	Reference Numbers
Capacitor, Dubilier Type 9HL, 5000 volts, rated 0.0004 mfd.	509, 510, 609, 610, 703, 705, 803, 805, 903, 905, 1003, 1005
Capacitor, Dubilier Type 15H, 3000 volts, rated 0.0001 mfd.	503, 504, 505
Capacitor, Dubilier Type 9HL, 5000 volts, rated 0.002 mfd.	2204, 2218
Capacitor, Dubilier Type 9HL, 5000 volts, rated 0.003 mfd.	2210, 2211
Capacitor, Dubilier Type 9HL, 5000 volts, rated 0.0035 mfd.	2212, 2215
Capacitor, Dubilier Type 9HL, 5000 volts, rated 0.0024 mfd.	2213, 2214
Capacitor, Dubilier Type PL, 3000 volts, rated 0.00009 mfd.	523, 524, 525
Capacitor, Dubilier Type 9L, 1000 volts, rated 0.0001 mfd.	1108, 1111
Capacitor, Dubilier Type 9L, 5000 volts, rated 0.0004 mfd.	909, 1009
Capacitor, General Electric, 1200 volts, rated 1.0 mfd.	1120, 1155, 1163
Capacitor, Dubilier Type HC, 300 volts, rated 1.0 mfd.	1144, 1160, 1185
Capacitor, Dubilier Type 9L, 1000 volts, rated 0.01 mfd.	1134, 1609
Capacitor, Hammarlund Mfg. Co., 8 to 26 mmf.	512, 612, 707, 807, 907, 1007, 2216
Choke, R-F, M-7461859 G1	1106, 1118
Compensator, G-E, K-7872696	2205, 2219
Resistor, wire wound, rated 5 ohms, 12 watt	1191, 1192
Resistor, wire wound, rated 15 ohms, 4.5 watt	517, 614, 2217
Resistor, Yaxley, variable, rated 3000 ohms	1113, 1114
Sockets SO-39 for Plug PL-59	1127, 1602
Sockets SO-41 for Plug PL-61	1126, 1601
Socket for Tube VT-4-C	1101, 1110, 1161, 1162
Switch, filament, G-E K-7870464	1102, 1131
Switch, filament, G-E K-7874706	1190, 1194
Switch, antenna, G-E Cat. 7760475 G1	529, 629, 724, 824, 924, 1024

Spare Part Designation	Electrical Rating	Manufacturer	Dimensions in Inches				Wt in Lbs.	Description
			Length	Width	Height	Dia.		
AFC-1	0.5H, 0.1 Amp.	General Electric	2.25	2.50	2.59	......	0.685	Microphone Filter Reactor
ARM-2		General Electric	9.375	......	......	3.25	7.25	Armature for Dynamotor Unit PE-73-B
BG-1		New Departure	......	......	0.5	1.25	0.065	Dynamotor Bearing
BP-1		General Electric	1.875	2.011	0.75	......	0.117	Antenna Binding Post on Tuning Unit
BP-3		General Electric	......	......	2.187	2.06	0.187	Binding Post on Antenna Tuning Unit
BP-4		General Electric	......	......	0.812	0.50	0.031	Binding Post on Antenna Tuning Unit
BP-5		General Electric	6.84	2.25	1.87	......	......	Antenna Binding Post on Transmitter
BR-5	H-V for Dynamotor	General Electric	0.75	0.25	0.25	......	0.017	Dynamotor Brush
BR-6	L-V for Dynamotor	General Electric	0.812	0.75	0.437	......	0.083	Dynamotor Brush
C-1	0.0001 mfd. 3000 V.	Cornell-Dubilier	2.81	0.937	1.937	......	0.270	Mica Capacitor
C-2	0.00003 mfd. 2000 V.	Cornell-Dubilier	2.81	0.937	1.937	......	0.225	Mica Capacitor
C-3	0.0004 mfd. 5000 V.	Cornell-Dubilier	1.75	1.32	1.781	......	0.129	Mica Capacitor
C-4	0.00009 mfd. 3000 V.	Cornell-Dubilier	2.81	0.937	1.937	......	0.270	Mica Capacitor
C-6	0.00005 mfd. 3000 V.	Cornell-Dubilier	2.81	0.937	1.937	......	0.229	Mica Capacitor
C-7	0.00005 mfd. 3000 V.	Cornell-Dubilier	2.81	0.937	1.937	......	0.229	Mica Capacitor
C-8	0.0004 mfd. 5000 V.	Cornell-Dubilier	1.75	1.32	0.468	......	0.068	Mica Capacitor
C-9	0.006 mfd. 2500 V.	Cornell-Dubilier	2.81	0.937	1.937	......	0.242	Mica Capacitor
C-10	0.02 mfd. 1000 V.	Cornell-Dubilier	1.75	1.32	0.468	......	0.090	Mica Capacitor
C-11	0.0001 mfd. 1000 V.	Cornell-Dubilier	1.75	1.32	0.468	......	0.066	Mica Capacitor
C-12	0.001 mfd. 4500 V.	Cornell-Dubilier	2.81	0.937	1.937	......	0.250	Mica Capacitor
C-13	1 mfd. 1200 V.	General Electric	1.75	1.00	4.375	......	0.513	Pyranol Filled Capacitor
C-14	0.01 mfd. 1000 V.	Cornell-Dubilier	1.75	1.32	0.468	......	0.074	Mica Capacitor
C-15	0.001 mfd. 2500 V.	Cornell-Dubilier	1.75	1.32	0.468	......	0.070	Mica Capacitor
C-16	1 mfd. 300 V.	Cornell-Dubilier	2.75	2.07	1.00	......	0.217	Paper Capacitor
C-17	25 mfd. 25 V.	Cornell-Dubilier	2.12	1.43	2.75	.....	0.140	Electrolytic Capacitor
C-18	0.001 mfd. 2500 V.	Cornell-Dubilier	1.75	1.32	0.468	......	0.070	Mica Capacitor
C-20	0.005 mfd. 5000 V.	Cornell-Dubilier	1.75	1.32	0.468	......	0.072	Mica Capacitor
C-21	0.002 mfd. 5000 V.	Cornell-Dubilier	1.75	1.31	0.78	......	0.126	Mica Capacitor
C-22	0.0001 mfd. 3000 V.	Cornell-Dubilier	2.81	0.937	2.125	......	0.250	Mica Capacitor
C-23	0.0002 mfd. 3000 V.	Cornell-Dubilier	2.81	0.937	2.125	......	0.250	Mica Capacitor
C-24	0.003 mfd. 5000 V.	Cornell-Dubilier	1.75	1.31	0.78	......	0.126	Mica Capacitor
C-25	0.0035 mfd. 5000 V.	Cornell-Dubilier	1.75	1.31	0.78	......	0.126	Mica Capacitor
C-26	0.0024 mfd. 5000 V.	Cornell-Dubilier	1.75	1.31	0.78	......	0.124	Mica Capacitor
C-27	0.0001 mfd. 3000 V.	Cornell-Dubilier	2.81	0.937	1.937	......	0.250	Mica Capacitor
C-28	0.0002 mfd. 3000 V.	Cornell-Dubilier	2.81	0.937	1.937	......	0.250	Mica Capacitor
C-29	0.0008 mfd. 3000 V.	Cornell-Dubilier	2.81	0.937	1.937	......	0.242	Mica Capacitor
C-30	0.002 mfd. 5000 V.	Cornell-Dubilier	1.75	1.31	0.468	......	0.068	Mica Capacitor
CSW-1		General Electric	1.18	0.531	1.56	......	0.036	Interlock Switch and Test Key
CSW-2		Hart & Hegeman	1.75	0.75	1.59	......	0.062	On-Off Switch
CSW-3		Hart & Hegeman	1.56	0.625	1.32	......	0.032	Voltmeter Switch
CSW-5		General Electric	2.63	2.63	2.109	......	0.150	Selector Switch
CSW-6		Yaxley Company	1.5	2.38	2.0	......	0.106	Side Tone Switch
CSW-7		General Electric	5.38	2.75	2.75	......	0.565	Antenna Circuit Switch
CSW-8		General Electric	2.25	2.62	3.0	......	0.349	Antenna Tap Switch
CSW-9		General Electric	10.0	2.56	2.43	......	0.55	Tandem Control Switch
CSW-10		General Electric	2.25	2.38	2.38	......	0.341	Antenna Coupling Switch
CSW-11		General Electric	10.0	2.56	2.38	......	0.498	Tandem Control Switch

RENEWAL PARTS (Continued)

Spare Part Designation	Electrical Rating	Manufacturer	Dimensions in Inches				Wt in Lbs.	Description
			Length	Width	Height	Dia.		
CSW-12	....	General Electric	5.18	......	......	2.75	0.594	Antenna Variometer Switch
CSW-13	....	General Electric	10.0	2.56	3.0	......	0.656	Tandem Control Switch
CSW-14	....	General Electric	2.25	2.38	2.38	......	0.312	Antenna Coupling Switch
FT-107	....	General Electric	10.62	7.5	0.82	......	1.45	Mounting FT-107
FT-115	....	General Electric	2.12	2.31	1.21	......	0.195	Mounting FT-115-B
FT-142	....	General Electric	9.5	8.0	0.40	......	0.69	Mounting FT-142
FT-151	....	General Electric	22.0	8.0	1.35	......	3.797	Mounting FT-151-A
FU-12	0.5 Amp. 1000 volts	General Electric	3.0	......	......	0.50	0.018	Fuse FU-12-A
FU-13	30 Amp. 250 volts	General Electric	2.0	......	......	0.56	0.055	Fuse FU-13
FU-18	1 Amp. 1000 volts	General.Electric	3.0	......	......	0.50	0.0187	Fuse FU-18-A
FU-22	60 Amp. 250 volts	Bussmann Mfg. Co.	3.0	......	......	0.812	0.117	Fuse FU-22
INS-1	....	General Electric	0.25	......	......	2.0	0.045	Ceramic Ring
INS-2	....	General Electric	1.81	0.375	0.375	......	0.020	Ceramic Post
INS-3	....	General Electric	1.25	0.375	1.25	......	0.049	Ceramic Insulator
INS-4	....	General Electric	1.75	0.375	0.875	......	0.048	Ceramic Insulator
INS-6	....	General Electric	2.43	0.375	0.875	......	0.07	Ceramic Insulator
INS-7	....	General Electric	1.25	0.375	0.375	......	0.014	Ceramic Insulator
INS-8	....	General Electric	0.875	0.375	0.375	......	0.01	Ceramic Insulator
INS-9	....	General Electric	1.0	0.375	0.375	......	0.012	Ceramic Post
INS-10	....	General Electric	1.25	0.375	0.375	......	0.013	Ceramic Post
INS-11	....	General Electric	1.25	0.375	0.375	......	0.013	Ceramic Post
INS-12	....	General Electric	3.25	3.0	0.375	......	0.021	Ceramic End Plate
INS-13	....	General Electric	0.875	0.375	0.375	......	0.01	Ceramic Post
INS-14	....	General Electric	1.0	0.375	0.375	......	0.012	Ceramic Post
INS-15	....	General Electric	1.375	......	......	2.125	0.125	Ceramic Insulator
INS-16	....	General Electric	0.281	......	......	0.625	0.007	Ceramic Insulator
J-1	....	General Electric	1.245	0.937	0.75	......	0.030	Jack JK-33-A
M-1	500 MA DC	General Electric	2.03	......	......	2.56	0.274	Ammeter IS-22 (Plate Milliammeter)
M-2	15 volts AC-DC	General Electric	2.03	......	......	2.56	0.278	Voltmeter IS-122
M-3	8 Amperes RF	General Electric	2.03	......	......	2.56	0.400	Ammeter IS-89
M-141	30 Amps. 250 Volts	General Electric	2.25	0.25	0.010	......	0.001	Fuse Link M-141 for Fuse FU-13
M-168	60 Amps. 250 Volts	Bussmann Mfg. Co.	3.43	0.375	0.060	......	0.008	Fuse Link M-168 for Fuse FU-22
R-2	2500 ohms 12 watts	IRC	3.0	......	......	0.750	0.059	Fixed Resistor
R-3	4000 ohms 12 watts	IRC	3.0	......	......	0.750	0.059	Fixed Resistor
R-4	200,000 ohms 1 watt	IRC	1.25	......	......	0.25	0.006	Fixed Resistor
R-5	250,000 ohms 1 watt	IRC	1.25	......	......	0.25	0.006	Fixed Resistor
R-8	50 ohms, 4 watt	IRC	1.75	......	......	0.43	0.020	Fixed Resistor
R-9	200 ohms 2 watt	IRC	0.875	......	......	0.43	0.013	Fixed Resistor
R-11	11,000 ohms 12 watt	IRC	3.0	......	......	0.75	0.059	Fixed Resistor
R-12	30,000 ohms 1 watt	IRC	1.25	......	......	0.25	0.006	Fixed Resistor
R-13	100 ohms 1 watt	General Electric	5.687	1.375	1.375	......	0.094	Parasitic Resistor and Choke
R-14	5 ohms 2 watt	IRC	0.875	......	......	0.43	0.0143	Fixed Resistor
R-15	2.70 ohms, 36 watts 3.70 ohms, 26 watts	General Electric	10.75	2.75	1.93	......	1.84	Fixed Resistor with Terminal Board
R-16	100 ohms, 12 watts...	IRC	3.0	......	......	0.75	......	Fixed Resistor
R-17	5 ohms, 12 watts	IRC	3.0	......	......	0.75	......	Fixed Resistor
R-18	150 ohms, 8 watts	IRC	2.0	......	......	0.75	......	Fixed Resistor
REL-3	....	General Electric	4.0	2.562	2.75	......	2.00	Starting Relay for Dynamotor
REL-4	....	General Electric	5.625	2.75	2.56	......	1.36	Antenna Switch Relay
RFC-1	....	General Electric	......	......	2.84	1.50	0.086	Radio Freq. Choke and Fixed Resistor

RENEWAL PARTS (Continued)

Spare Part Designation	Electrical Rating	Manufacturer	Dimensions in Inches				Wt in Lbs.	Description
			Length	Width	Height	Dia.		
RFC-2	....	General Electric	......	......	1.45	1.50	0.066	Radio Freq. Choke
RFC-3	....	General Electric	......	......	1.45	1.187	0.066	Radio Freq. Choke
RFC-4	....	General Electric	......	......	1.45	1.187	0.066	Radio Freq. Choke
RFC-5	....	General Electric	......	......	1.45	1.187	0.066	Radio Freq. Choke
RFC-6	....	General Electric	......	......	1.45	1.187	0.046	Radio Freq. Choke
RFC-7	....	General Electric	......	......	1.45	1.06	0.043	Radio Freq. Choke
RFC-8	....	General Electric	......	......	1.45	1.06	0.063	Radio Freq. Choke
RFC-9	....	General Electric	......	......	1.45	0.937	0.039	Radio Freq. Choke
RFC-10	....	General Electric	......	......	1.45	0.937	0.039	Radio Freq. Choke
RFC-11	....	General Electric	......	......	1.45	0.937	0.038	Radio Freq. Choke
RFC-12	....	General Electric	......	......	1.45	0.937	0.038	Radio Freq. Choke
RFC-13	....	General Electric	......	......	2.81	0.625	0.052	Radio Freq. Choke
RFC-14	....	General Electric	......	......	1.93	1.187	0.054	Radio Freq. Choke
RFC-15	....	General Electric	......	......	1.45	1.06	0.053	Radio Freq. Choke
RFC-16	....	General Electric	......	......	1.50	1.453	0.066	Radio Freq. Choke
RFC-17	....	General Electric	......	......	1.484	1.687	0.124	Radio Freq. Choke and Fixed Resistor
RFC-18	....	General Electric	......	......	1.844	1.687	0.092	Radio Freq. Choke
TR-1	....	General Electric	4.0	2.625	2.953	......	2.5	Microphone Transf.
TR-2	....	General Electric	4.09	2.75	3.375	......	2.31	Interstage Transf.
TR-3	....	General Electric	3.75	3.25	4.75	......	4.81	Modulation Transf.
TSK-1	....	General Electric	......	......	1.25	4.0	0.224	Socket for Tube VT-4-C
TSK-2	....	Hammarlund Mfg. Co.	2.25	1.62	0.68	......	0.0635	Socket for Tube VT-25
VR-1	3000 ohms	Yaxley Mfg. Co.	1.375	1.625	2.0	......	0.104	Variable Resistor
VR-2	200 ohms	Yaxley Mfg. Co.	1.625	1.625	2.0	......	0.108	Variable Resistor

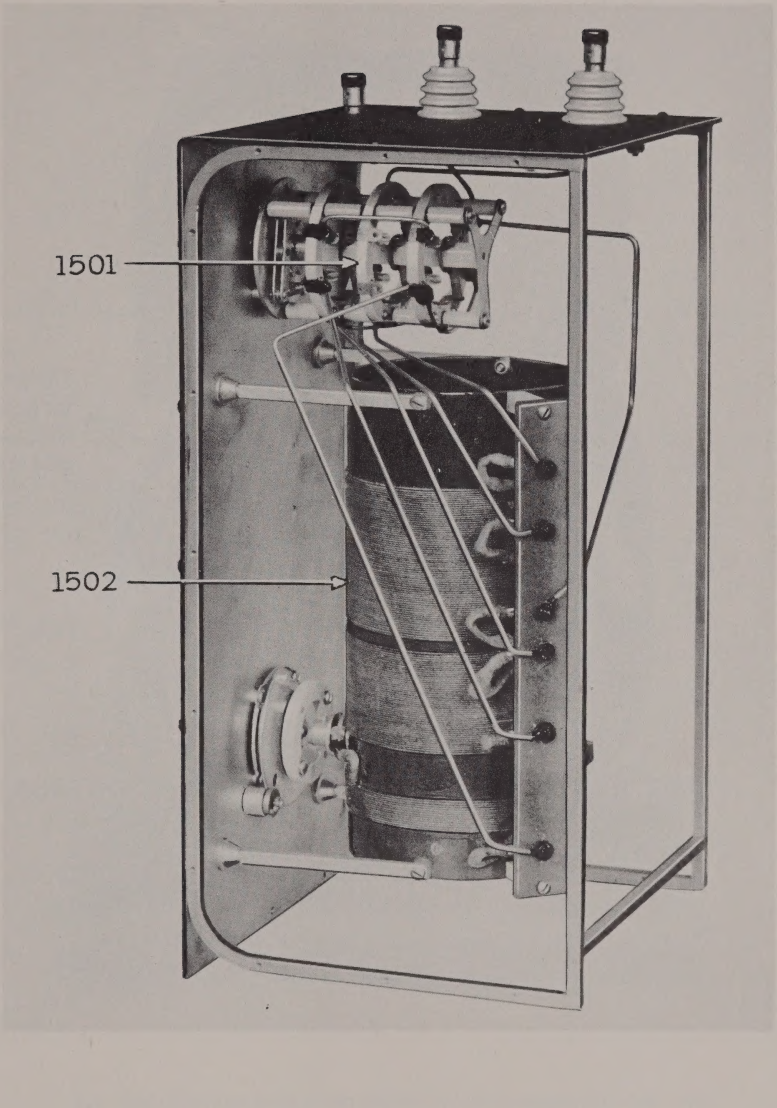


FIG. 21. ANTENNA TUNING UNIT BC-306-A, INTERIOR VIEW

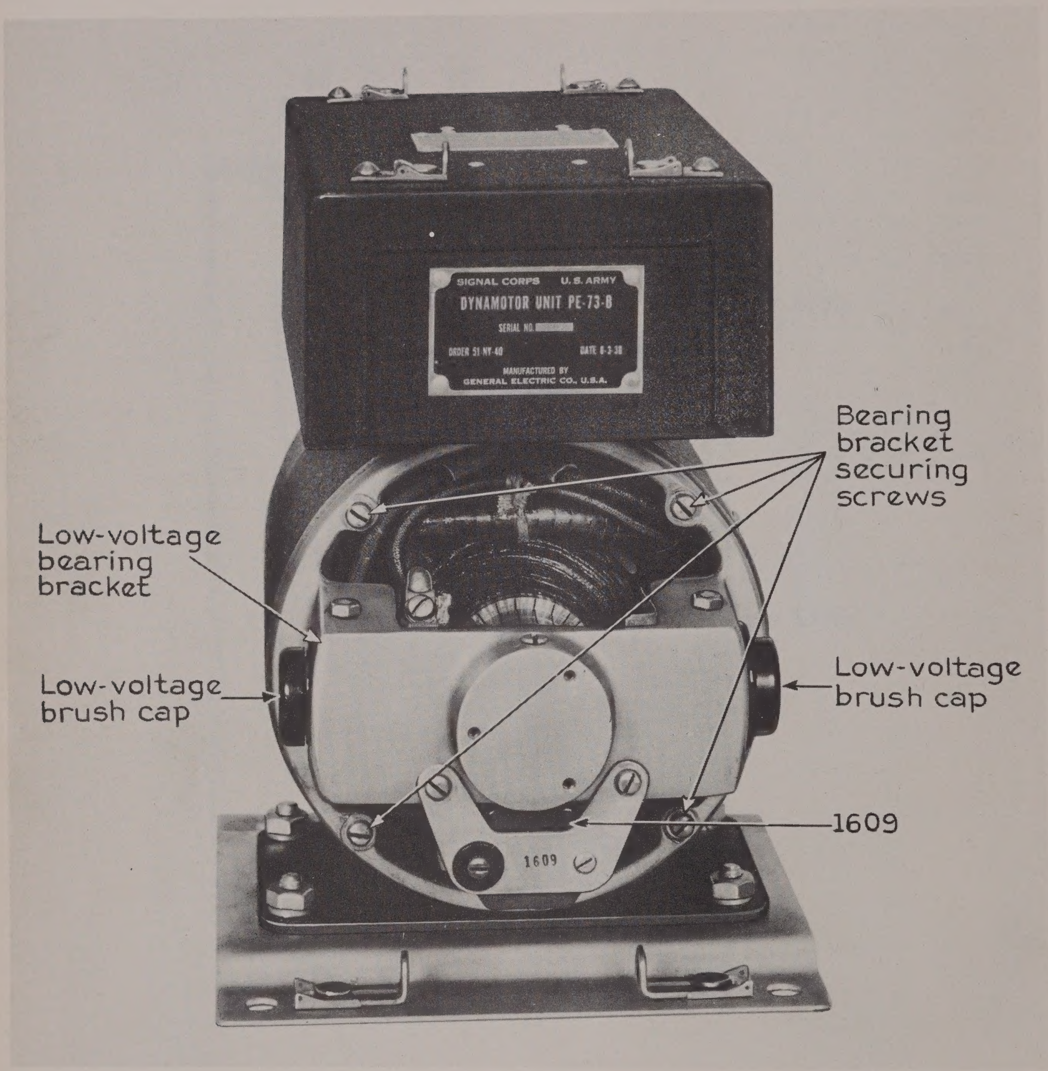

SIGNAL CORPS U.S. ARMY
DYNAMOTOR UNIT PE-73-B
SERIAL NO.
ORDER 51-NY-40
DATE 6-3-38
MANUFACTURED BY
GENERAL ELECTRIC CO., U.S.A.
Bearing bracket securing screws
Low-voltage bearing bracket
Low-voltage brush cap
Low-voltage brush cap
1609
1609

FIG. 22. DYNAMOTOR UNIT PE-73-B; MOUNTING FT-107 AND LOW-VOLTAGE END BELL REMOVED

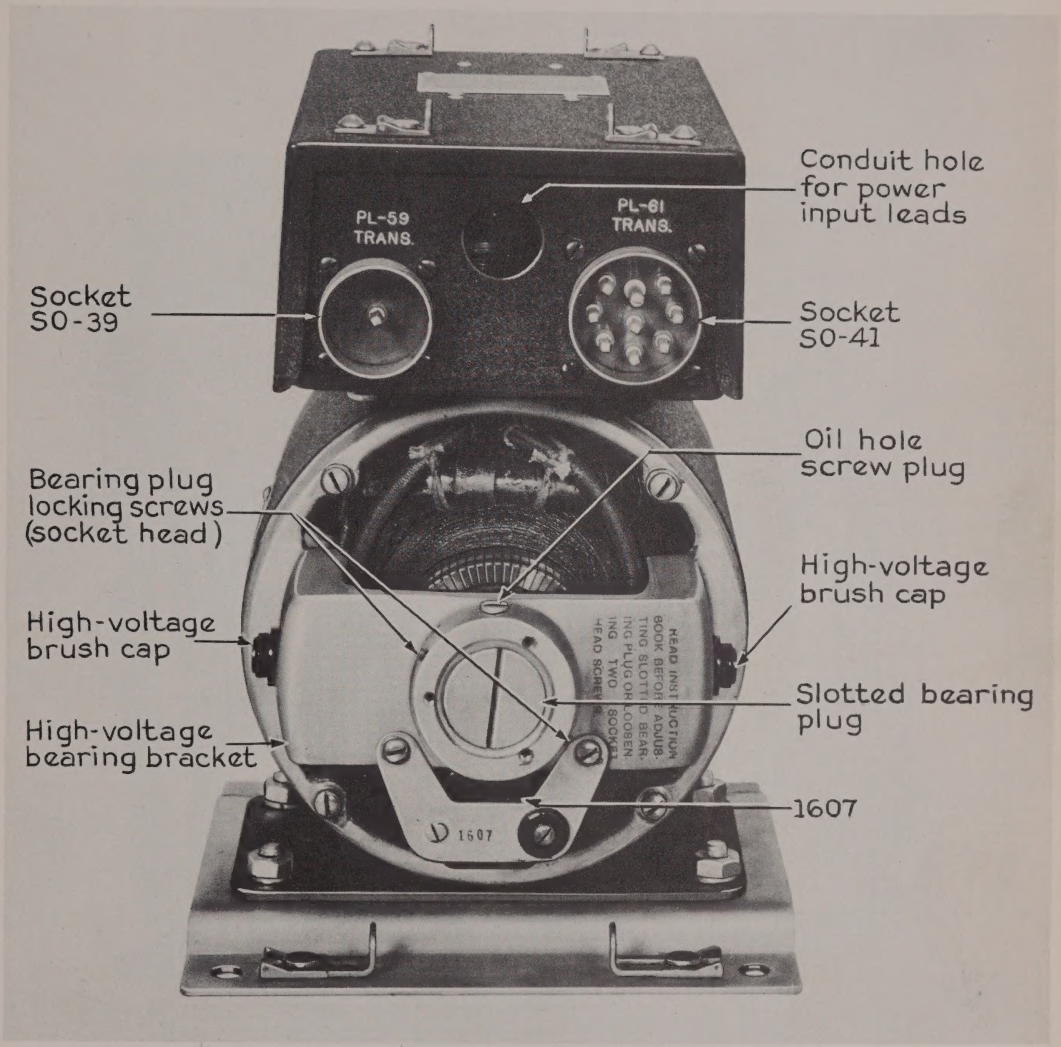
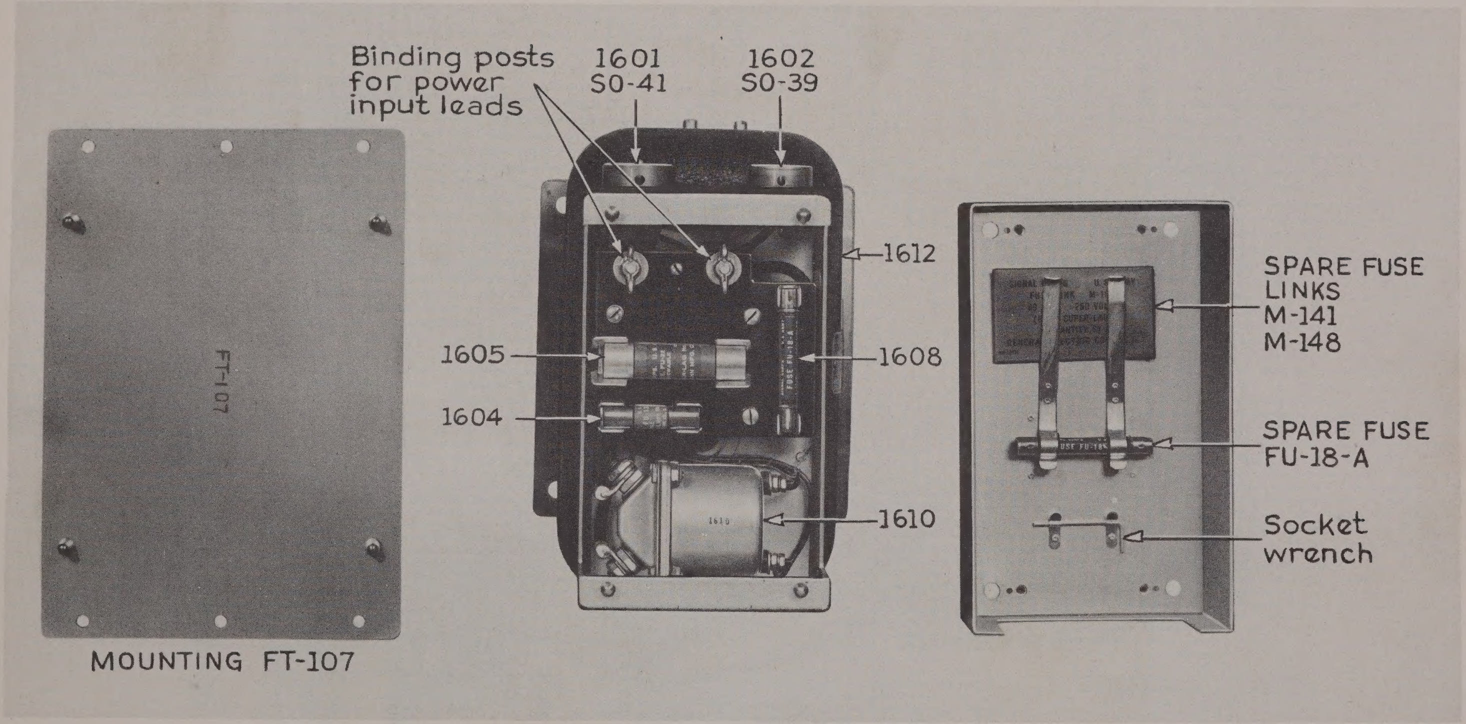

Conduit hole for power input leads
PL-59 TRANS.
PL-61 TRANS.
Socket SO-39
Socket SO-41
Oil hole screw plug
Bearing plug locking screws (socket head)
High-voltage brush cap
High-voltage brush cap
Slotted bearing plug
High-voltage bearing bracket
1607
1607

FIG. 23. DYNAMOTOR UNIT PE-73-B; MOUNTING FT-107 AND HIGH-VOLTAGE END BELL REMOVED



Binding posts for power input leads
1601
SO-41
1602
SO-39
1612
1605
1608
1604
1610
FT-107
MOUNTING FT-107
SPARE FUSE LINKS
M-141
M-148
SPARE FUSE
FU-18-A
Socket wrench

FIG. 24. DYNAMOTOR UNIT PE-73-B, TOP VIEW; WITH MOUNTING FT-107 AND RELAY-FUSE BOX COVER REMOVED

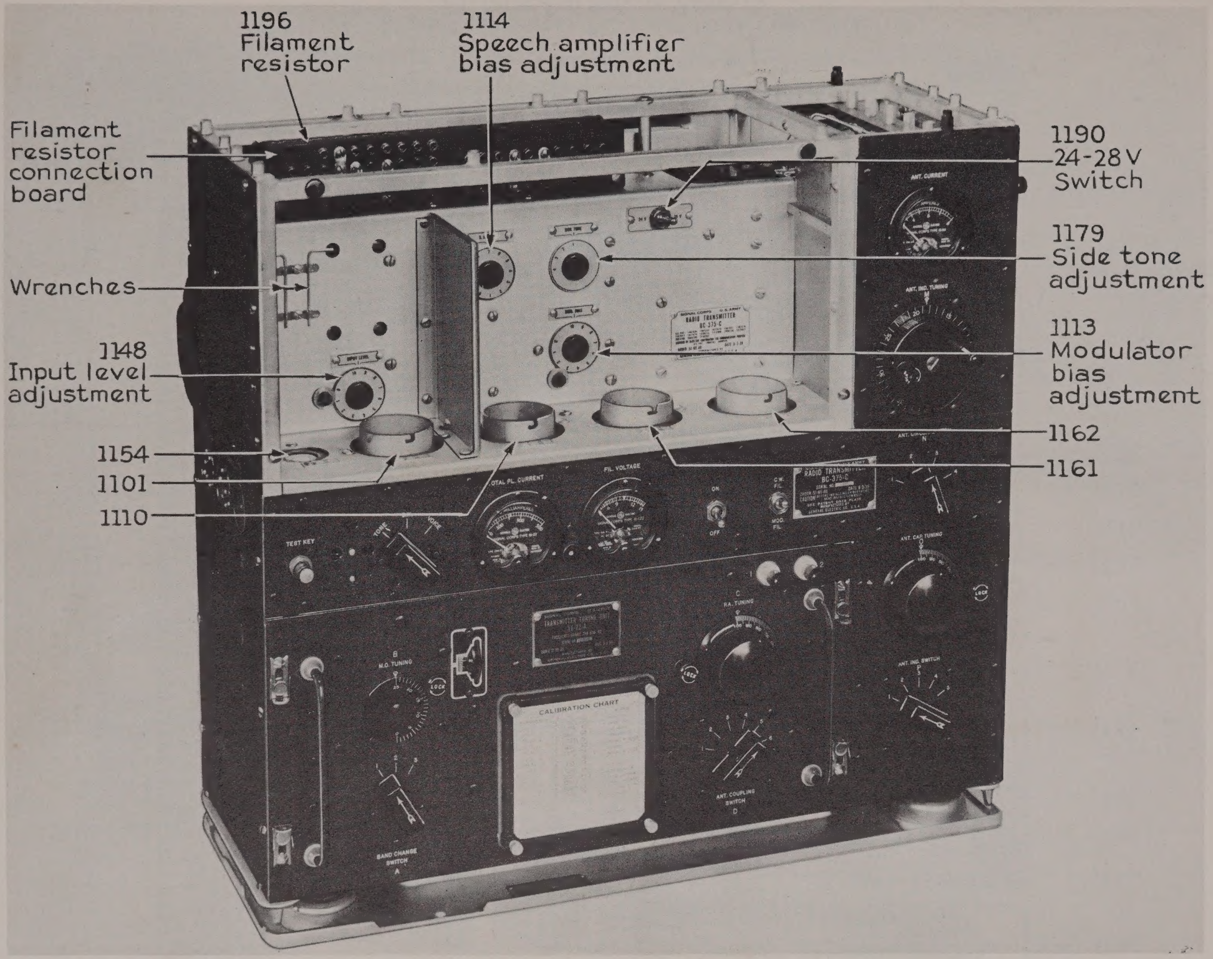

1196 Filament resistor
1114 Speech amplifier bias adjustment
Filament resistor connection board
1190 24-28 V Switch
1179 Side tone adjustment
Wrenches
1113 Modulator bias adjustment
1148 Input level adjustment
1162
1161
1154
1101
1110
TEST KEY
CALIBRATION CHART
ANT. CURRENT
ANT. IND. TUNING
FIL. VOLTAGE
ANT. CAP. TUNING
ANT. IND. SWITCH
ANT. COUPLING SWITCH
BAND CHANGE SWITCH
M.O. TUNING
P.A. TUNING
RADIO TRANSMITTER BC-375-C

FIG. 25. RADIO TRANSMITTER BC-375-C, TUBE COMPARTMENT SHIELD AND TOP COVER OFF AND TRANSMITTER TUNING UNIT IN PLACE

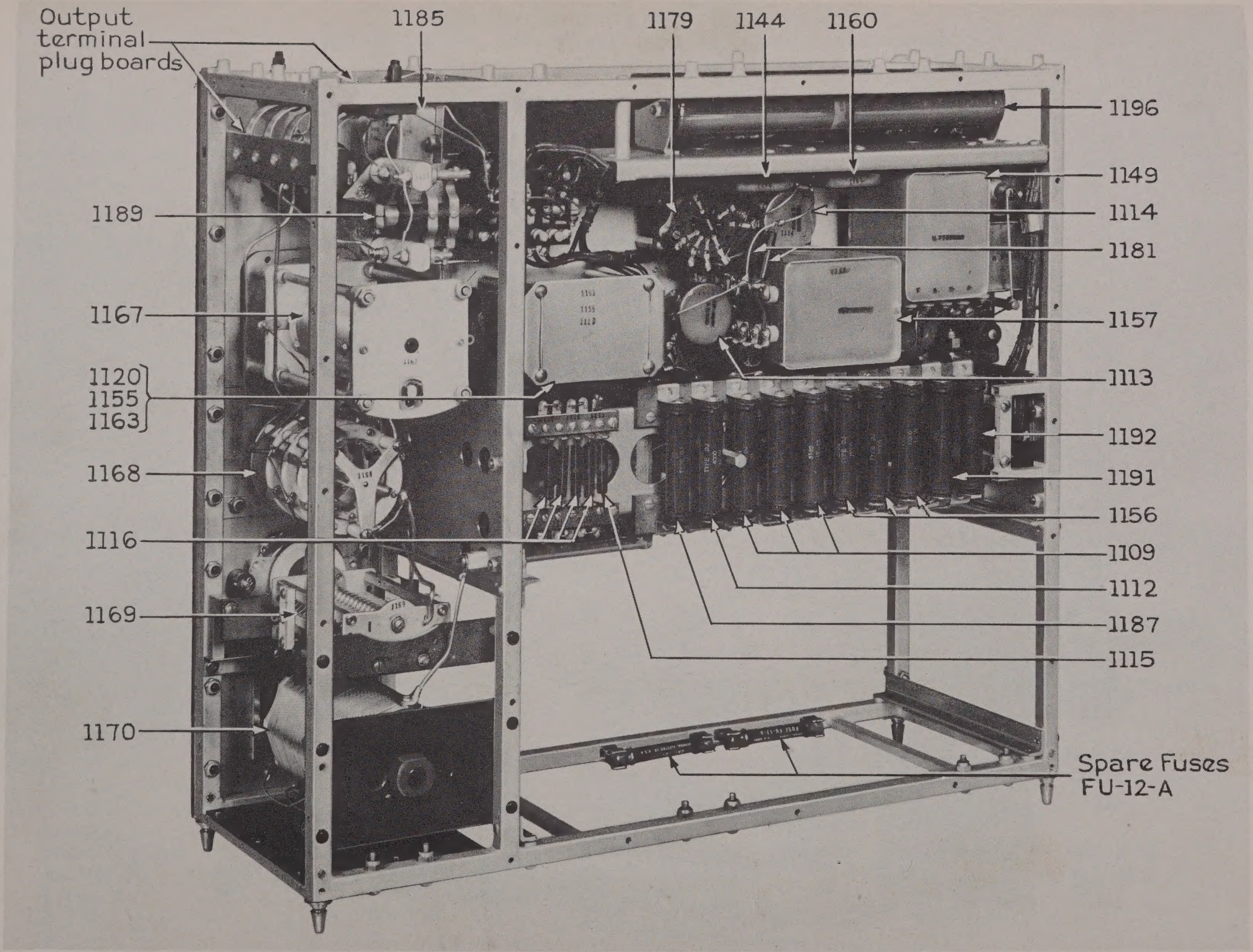

Output terminal plug boards
1185
1179
1144
1160
1196
1149
1114
1181
1157
1113
1192
1191
1156
1109
1112
1187
1115
Spare Fuses FU-12-A
1189
1167
1120
1155
1163
1168
1116
1169
1170

FIG. 26. RADIO TRANSMITTER BC-375-C, REAR VIEW; MOUNTING FT-151-A AND SHIELDS REMOVED

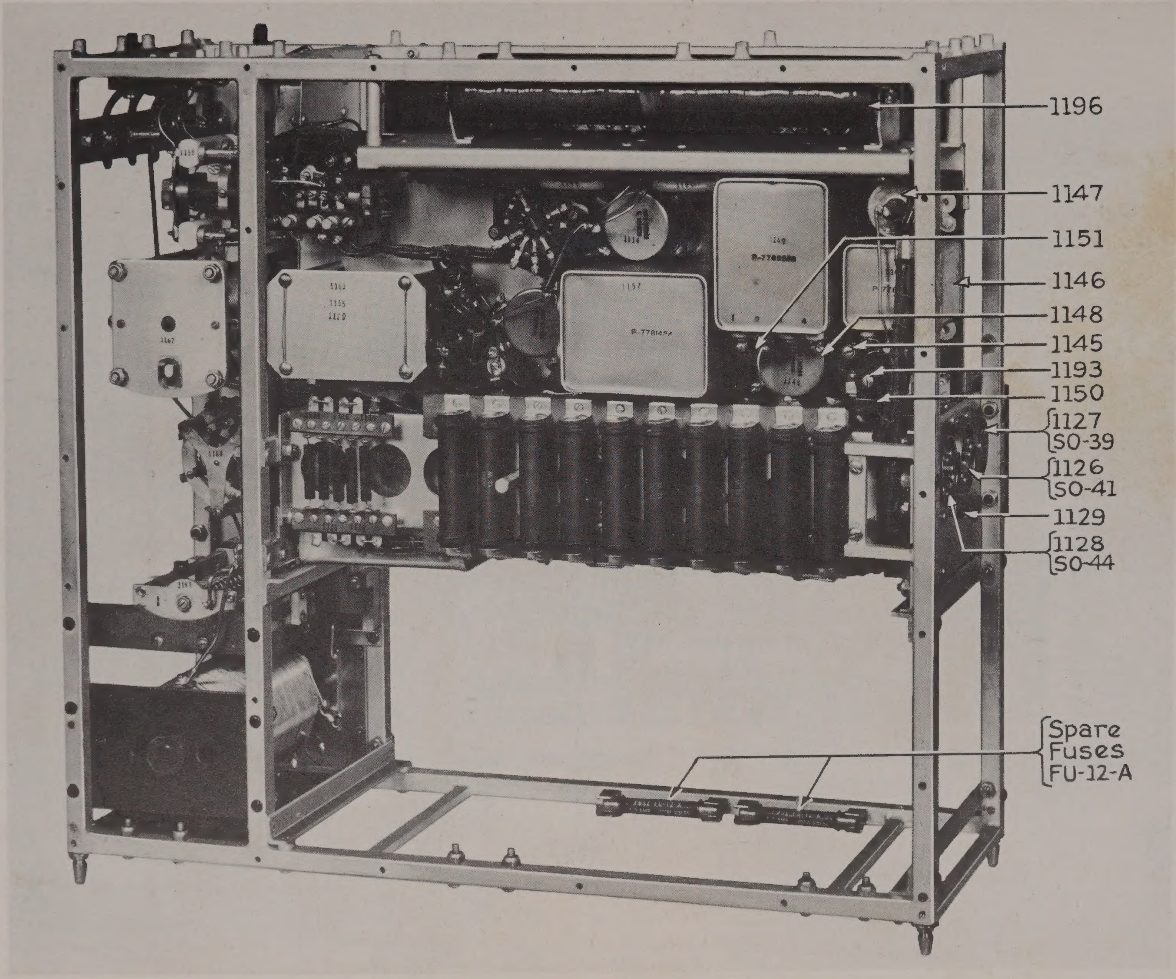

1196
1147
1151
1146
1148
1145
1193
1150
1127
SO-39
1126
SO-41
1129
1128
SO-44
Spare
Fuses
FU-12-A

FIG. 27. RADIO TRANSMITTER BC-375-C, REAR VIEW; MOUNTING FT-151-A AND SHIELDS REMOVED

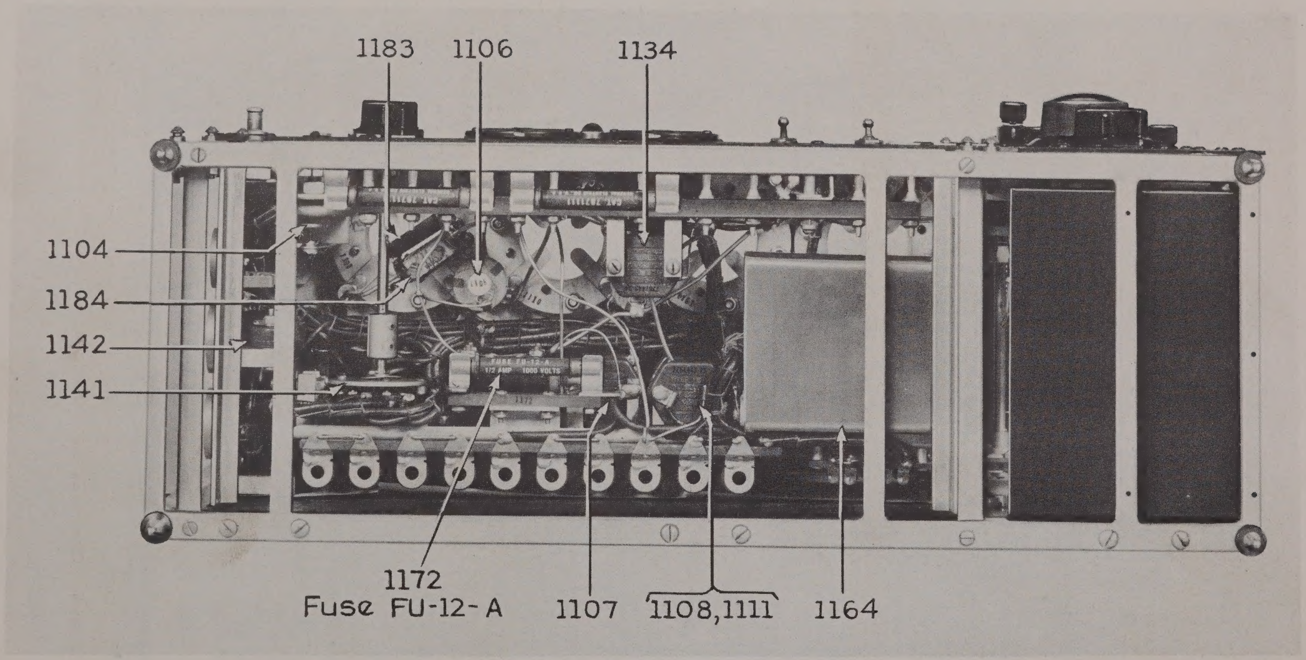

1183
1106
1134
1104
1184
1142
1141
1172
Fuse FU-12- A
1107
1108,1111
1164

FIG. 28. RADIO TRANSMITTER BC-375-C, BOTTOM VIEW; MOUNTING FT-151-A AND SHIELDS REMOVED

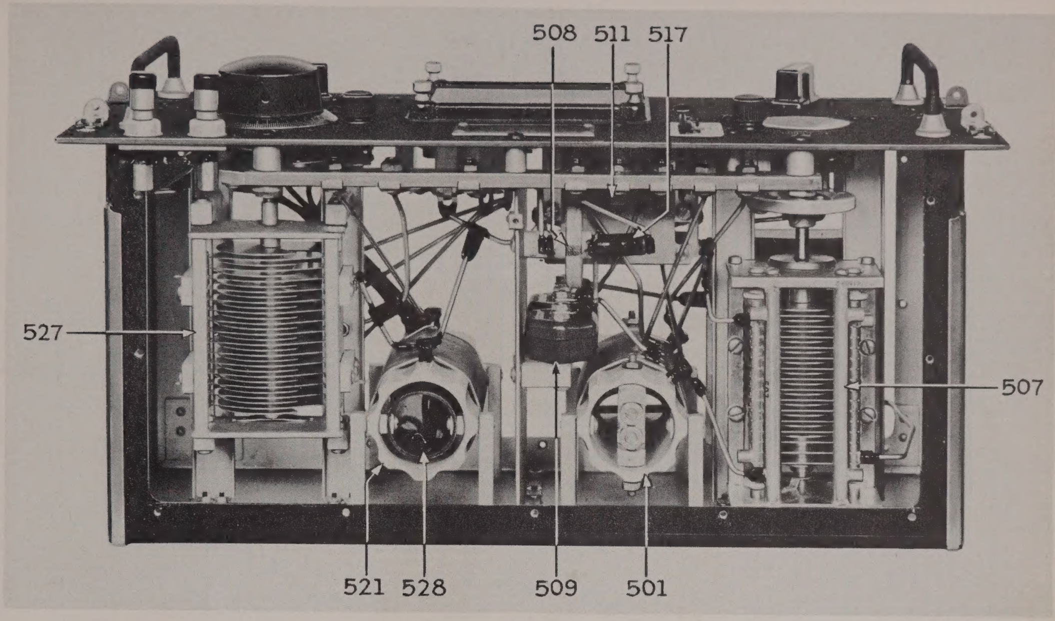

508
511
517
527
507
521
528
509
501

FIG. 29. TRANSMITTER TUNING UNIT TU-5-A, TOP VIEW, COVER REMOVED

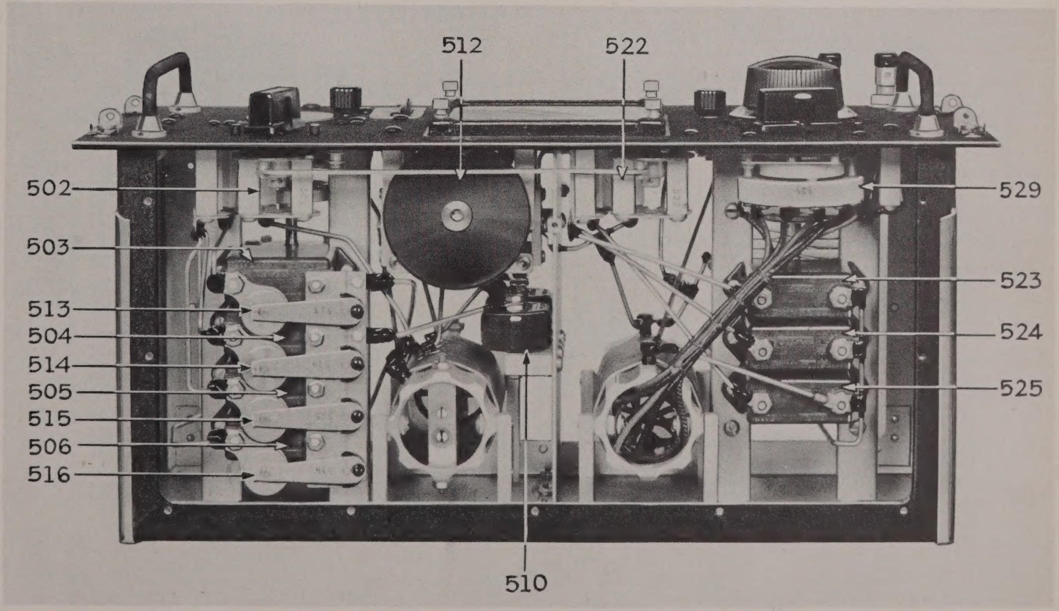

512
522
502
503
513
504
514
505
515
506
516
529
523
524
525
510

FIG. 30. TRANSMITTER TUNING UNIT TU-5-A, BOTTOM VIEW, COVER REMOVED

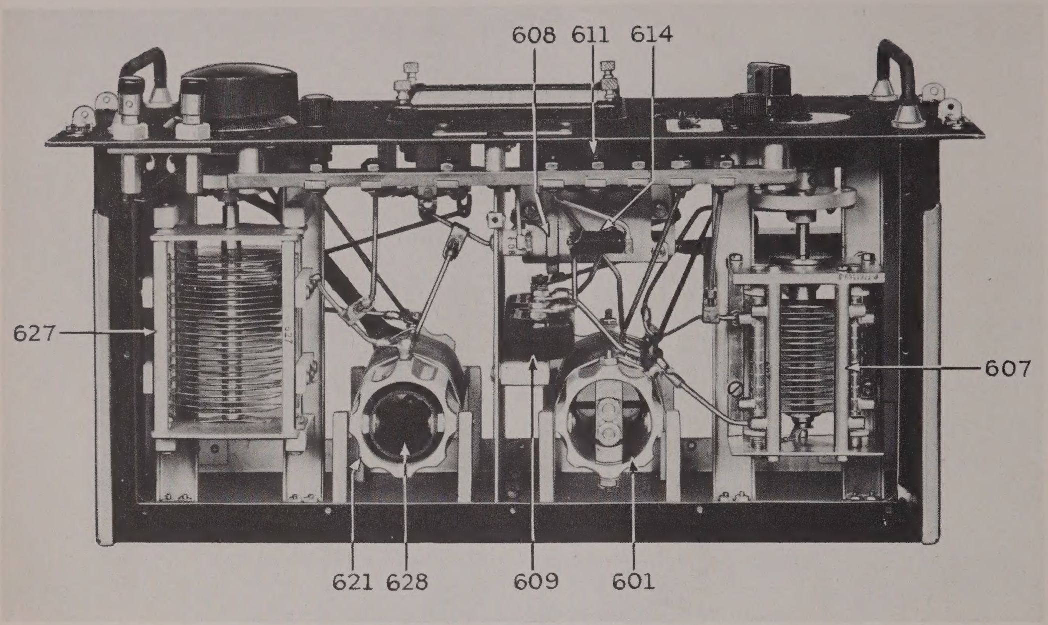

608
611
614
627
607
621
628
609
601

FIG. 31. TRANSMITTER TUNING UNIT TU-6-A, TOP VIEW, COVER REMOVED

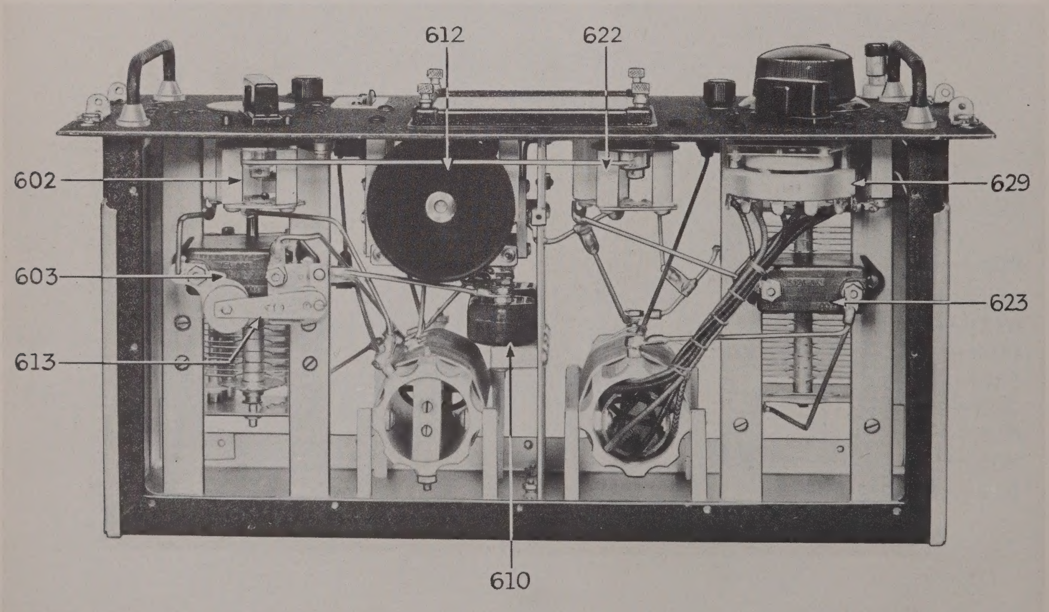

612
622
602
629
603
623
613
610

FIG. 32. TRANSMITTER TUNING UNIT TU-6-A, BOTTOM VIEW, COVER REMOVED

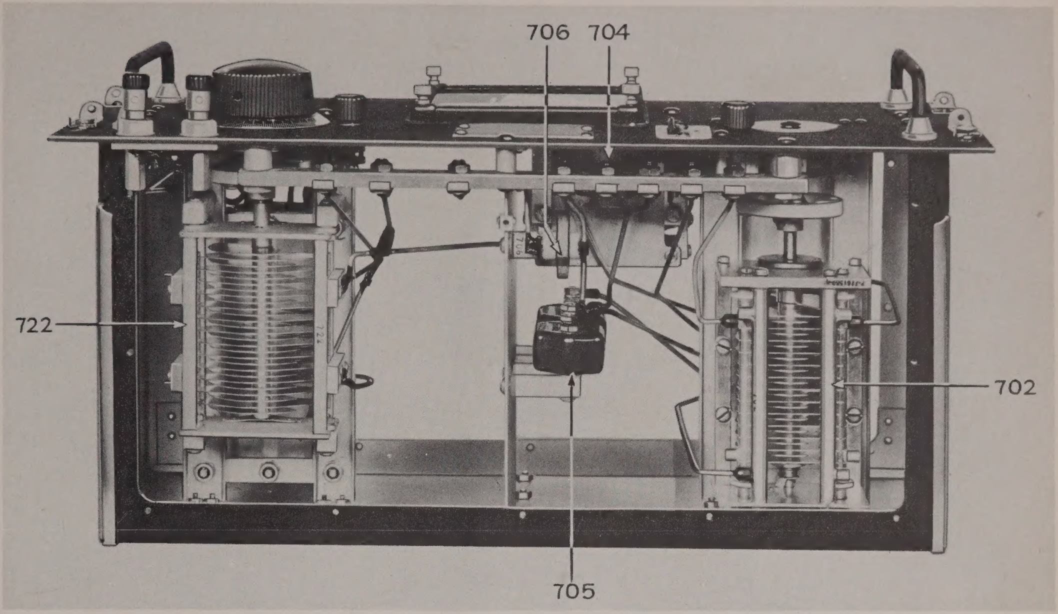

706
704
722
702
705

FIG. 33. TRANSMITTER TUNING UNIT TU-7-A, TOP VIEW, COVER REMOVED

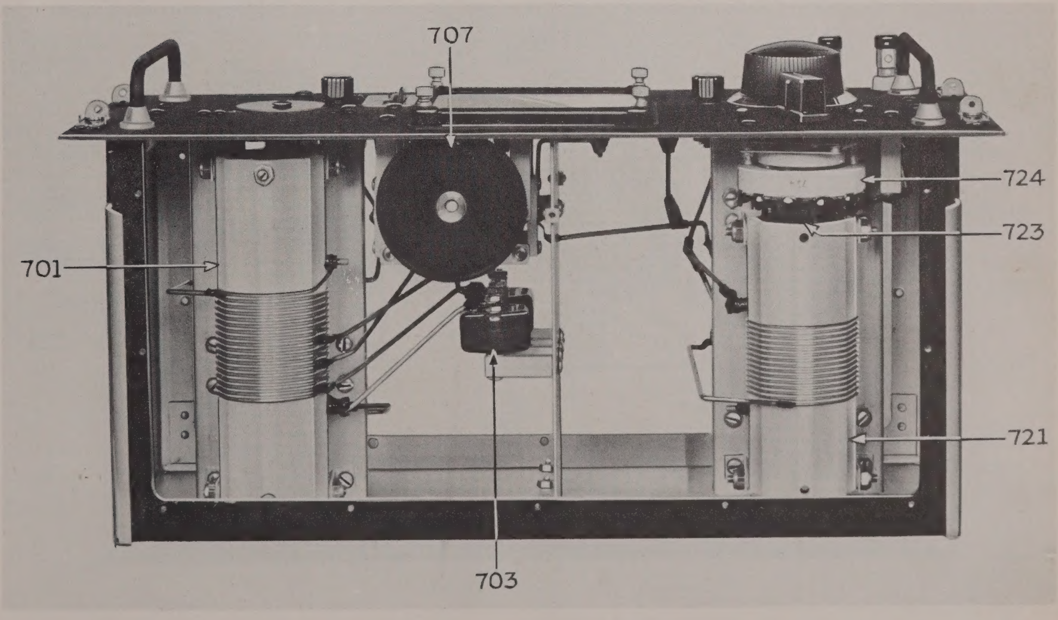

707
701
724
723
721
703

FIG. 34. TRANSMITTER TUNING UNIT TU-7-A, BOTTOM VIEW, COVER REMOVED

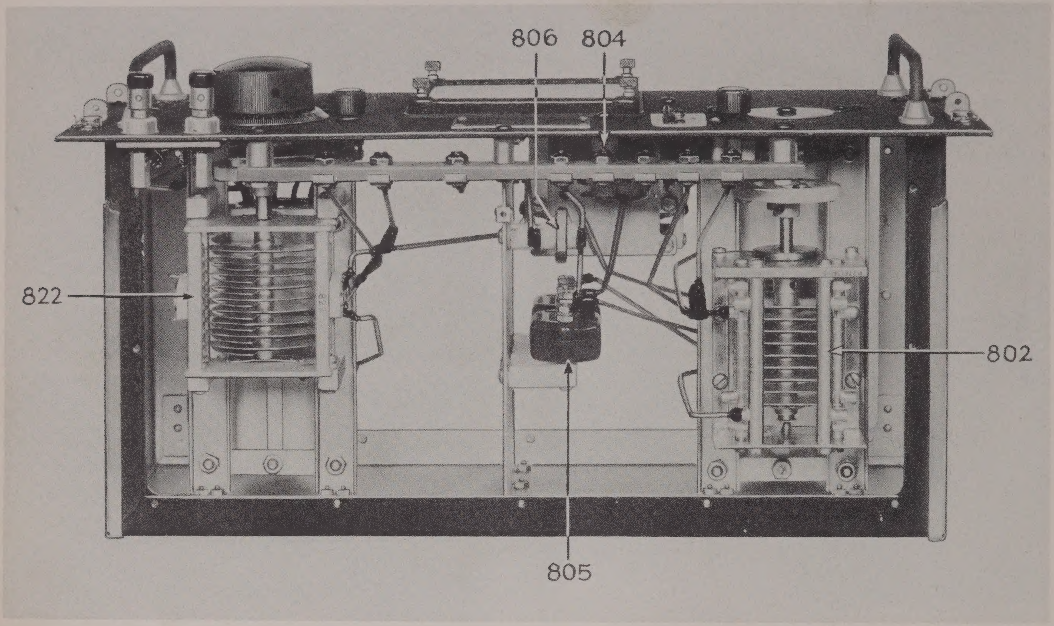

806
804
822
802
805

FIG. 35. TRANSMITTER TUNING UNIT TU-8-A, TOP VIEW, COVER REMOVED

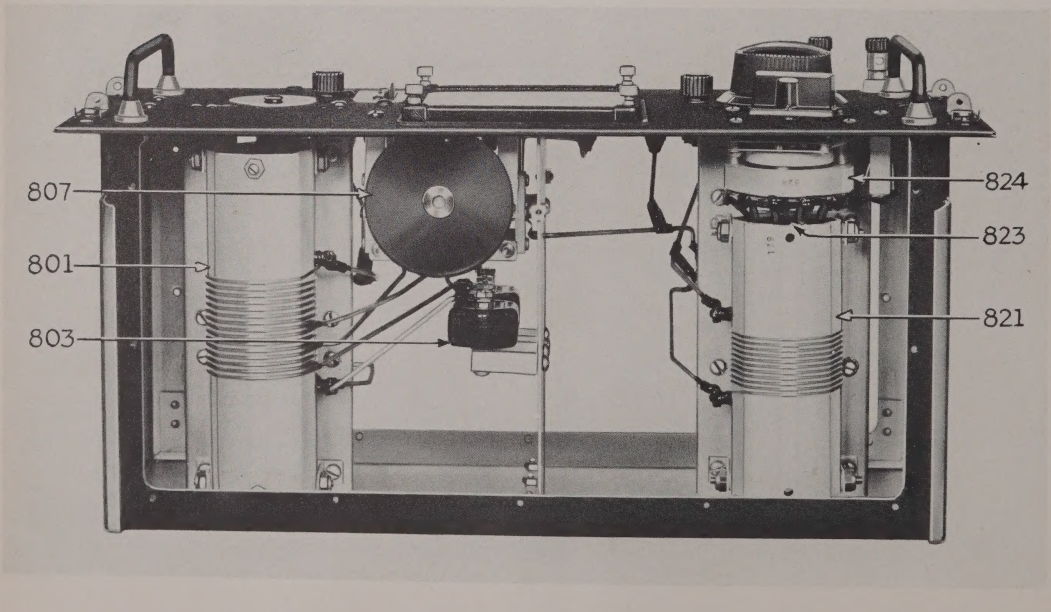

807
801
803
824
823
821

FIG. 36. TRANSMITTER TUNING UNIT TU-8-A, BOTTOM VIEW, COVER REMOVED

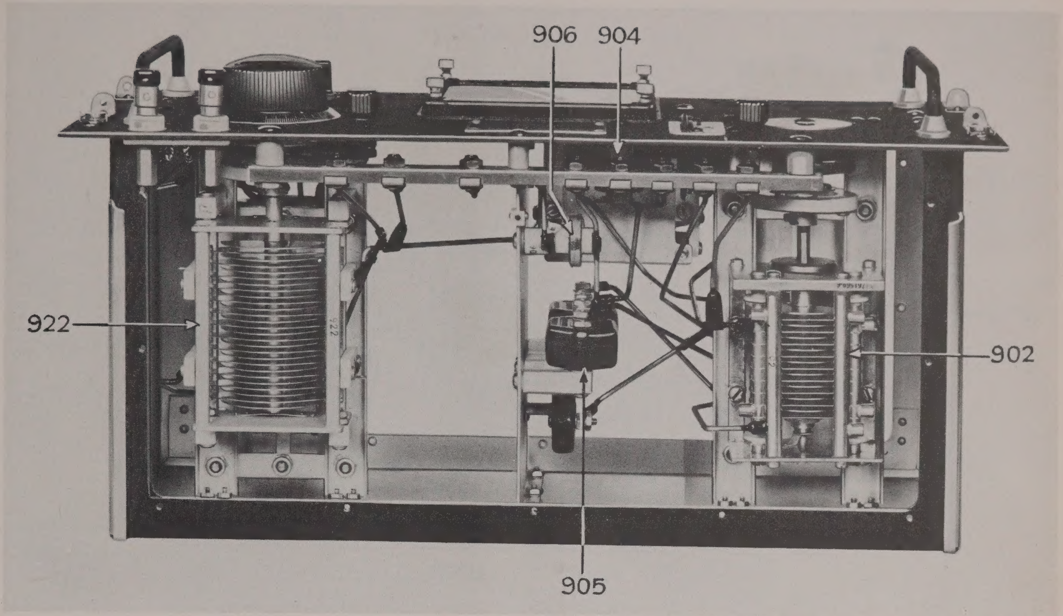

906
904
922
902
905

FIG. 37. TRANSMITTER TUNING UNIT TU-9-A, TOP VIEW, COVER REMOVED

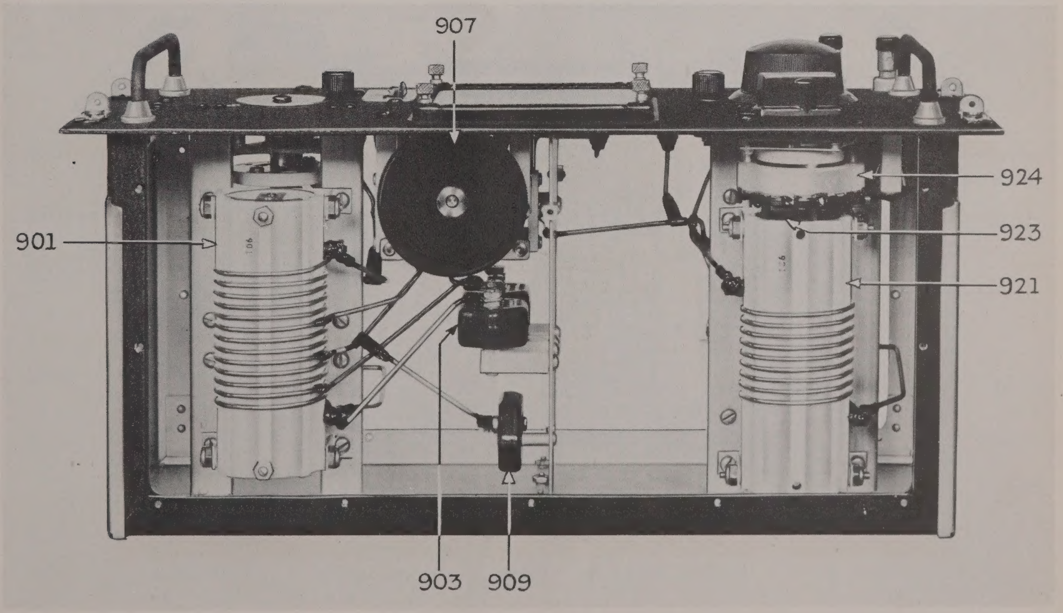
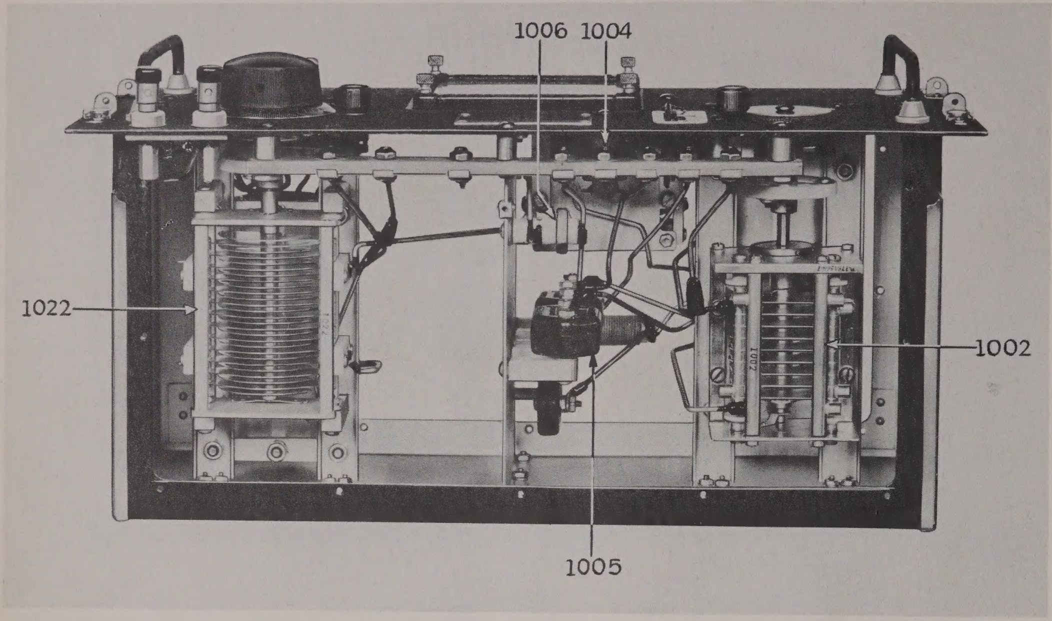

907
924
901
923
921
903
909

FIG. 38. TRANSMITTER TUNING UNIT TU-9-A, BOTTOM VIEW, COVER REMOVED


1006
1004
1022
1002
1005

Transmitter Tuning Unit TU-10-A, Top View, Cover Removed

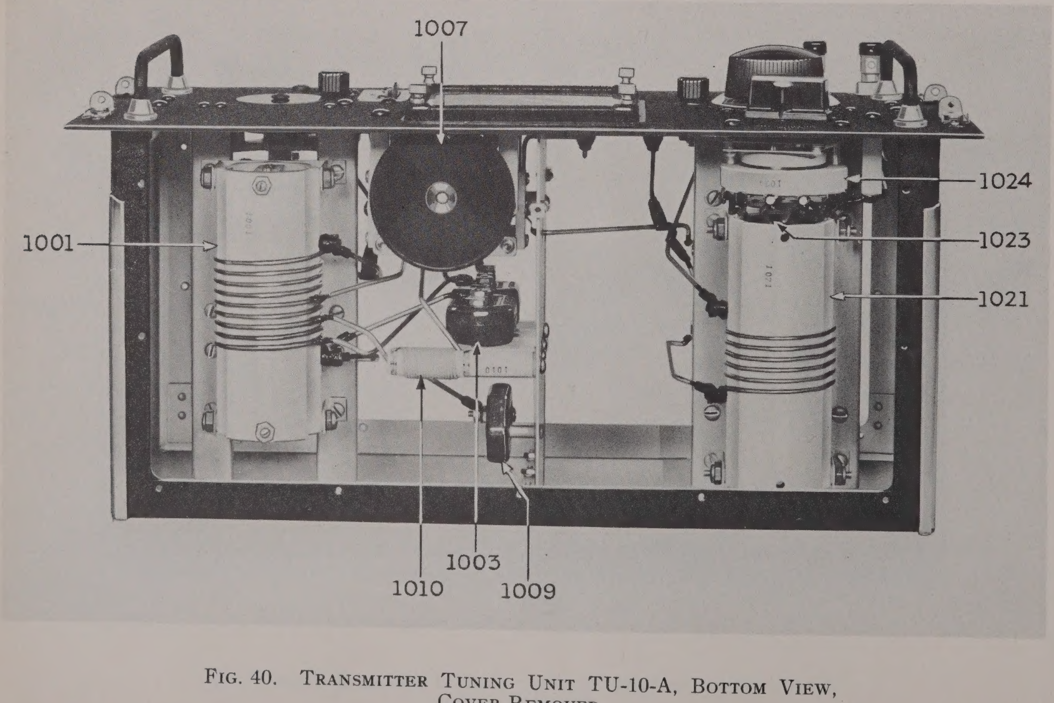

1007
1001
1024
1023
1021
1003
1010
1009

Fig. 40. Transmitter Tuning Unit TU-10-A, Bottom View, Cover Removed

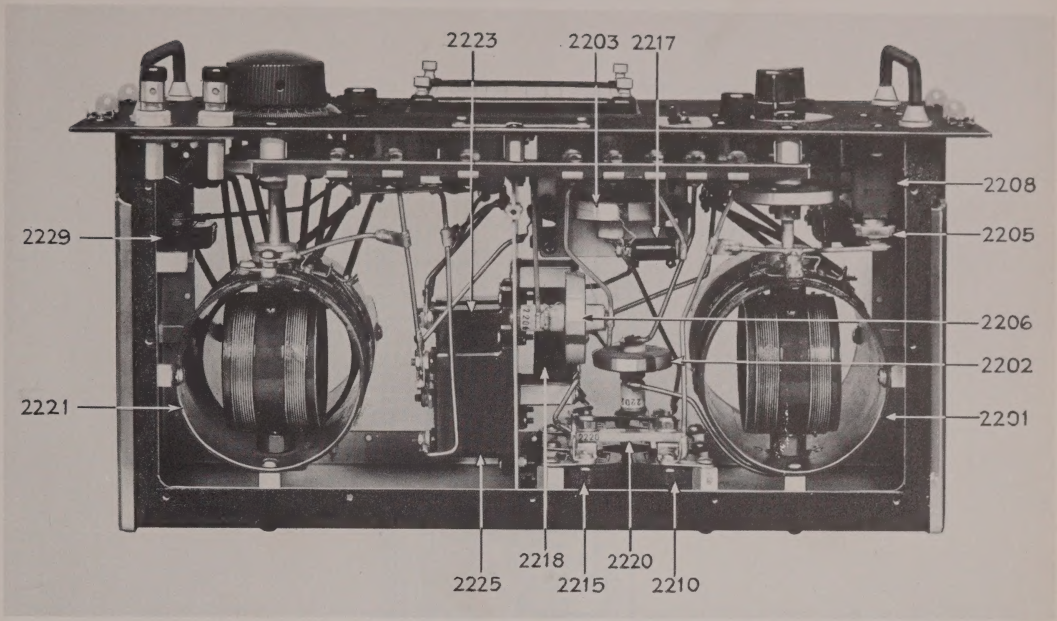

2223
2203
2217
2229
2208
2205
2206
2202
2221
2201
2218
2220
2225
2215
2210

Fig. 41. Transmitter Tuning Unit TU-22-A, Top View, Cover Removed

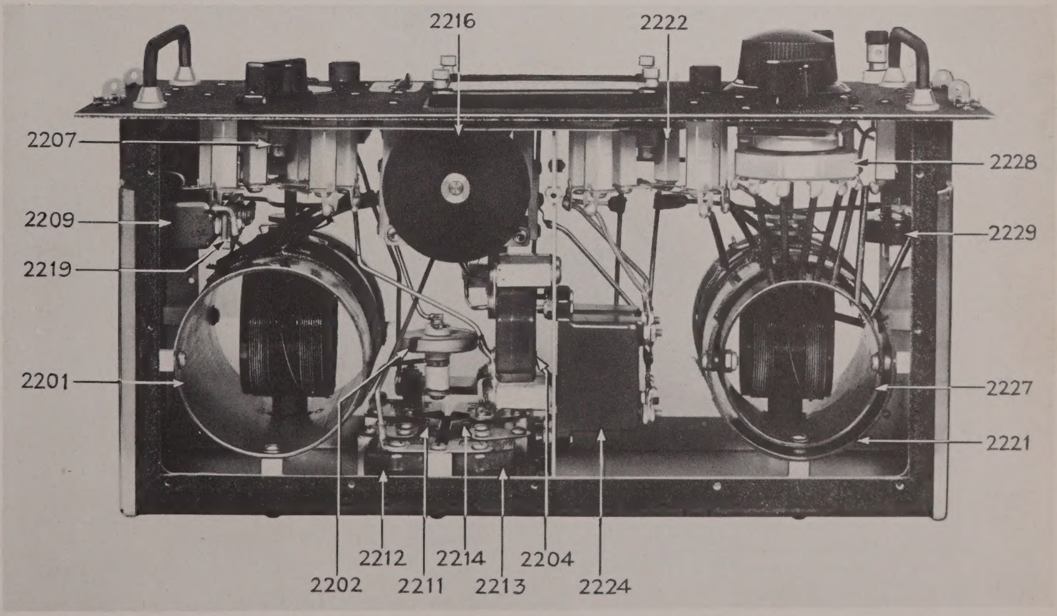
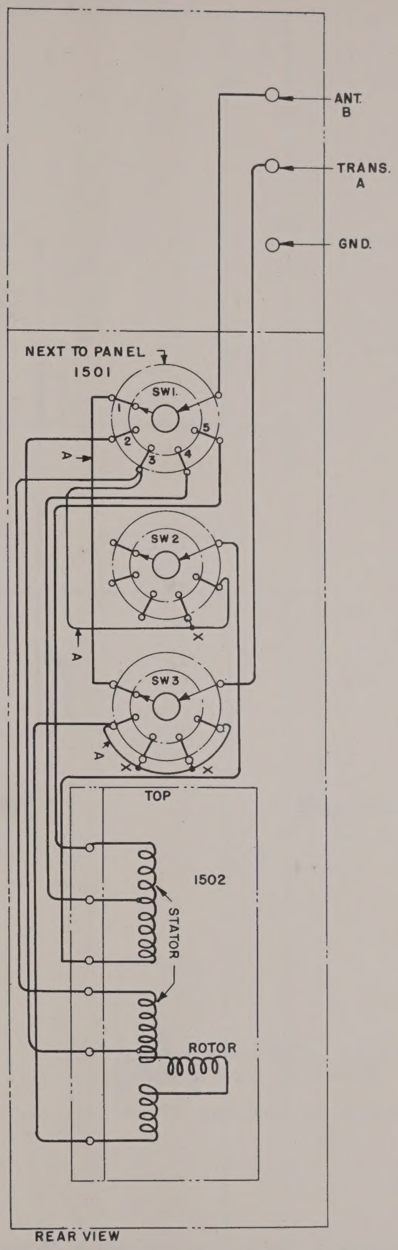

2216
2222
2207
2228
2209
2229
2219
2201
2227
2221
2212
2214
2204
2202
2211
2213
2224

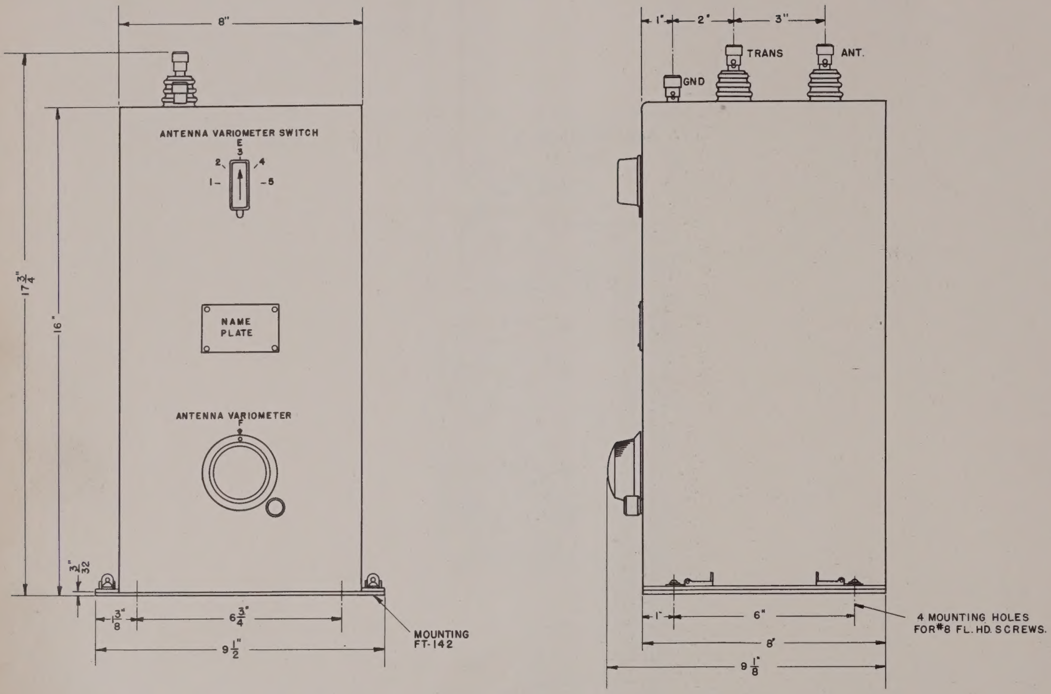
Fig. 42. Transmitter Tuning Unit TU-22-A, Bottom View, Cover Removed


ANT.
B
TRANS.
A
GND.
NEXT TO PANEL
1501
SW1.
1
2
3
4
5
A
SW 2
X
A
SW3
A
X
X
TOP
1502
STATOR
ROTOR
REAR VIEW

CONNECTION	SIZE OF CONDUCTOR
UNMARKED	.102" DIA. COPPER WIRE TINNED
A	.080" DIA. COPPERWIRE TINNED

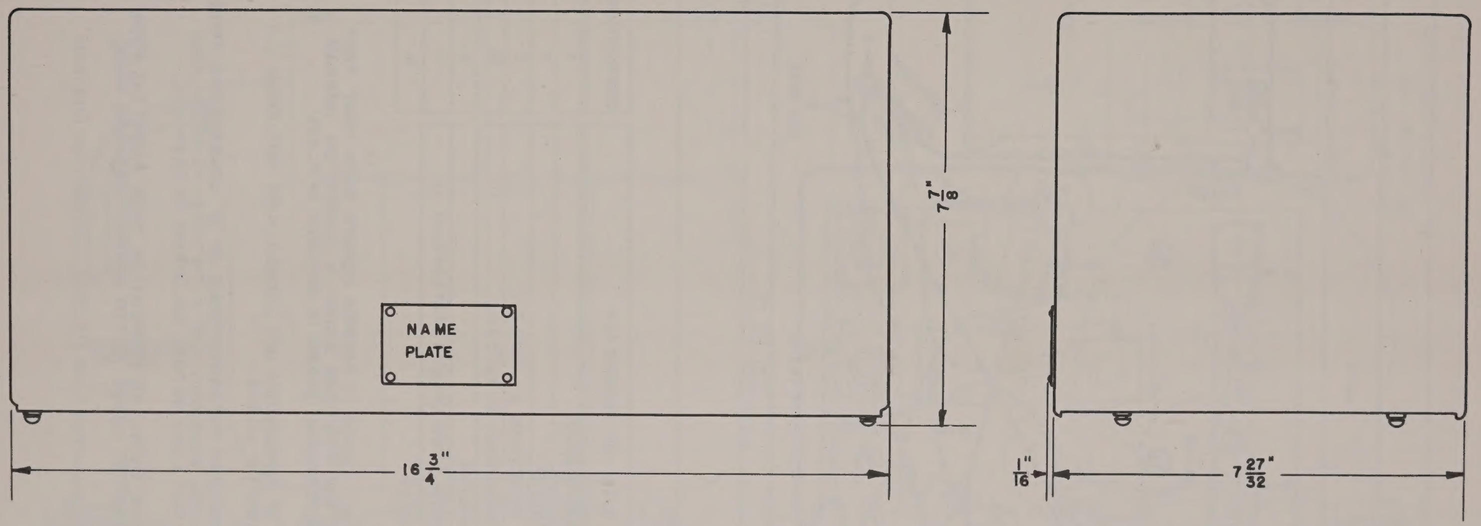
AT POINTS MARKED "X" USE COTTER PIN $\frac{1}{16}$" x $\frac{3}{8}$"

FIG. 43. ANTENNA TUNING UNIT BC-306-A, CONNECTION DIAGRAM


8"
17 3/4"
16"
3/32"
ANTENNA VARIOMETER SWITCH
E
3
2
4
1
5
NAME PLATE
ANTENNA VARIOMETER
F
1 3/8"
6 3/4"
9 1/2"
MOUNTING FT-142
1"
2"
3"
GND
TRANS
ANT.
1"
6"
8"
9 1/8"
4 MOUNTING HOLES FOR #8 FL. HD. SCREWS.

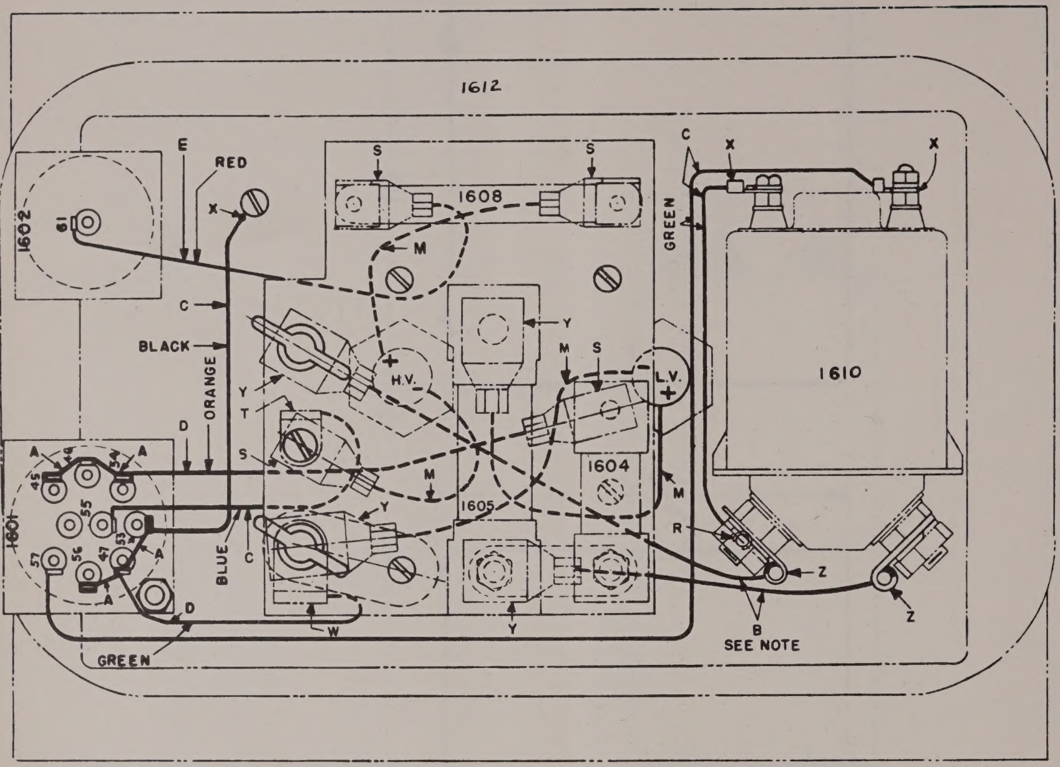
Weight of Antenna Tuning Unit BC-306-A, Less Mounting	9.026 lb
Weight of Mounting FT-142	0.687 lb

Fig. 44. Antenna Tuning Unit BC-306-A, Dimensions and Weight


NAME
PLATE
16 3/4"
7 7/8"
1/16"
7 27/32"

Weight of Case CS-48 .... 4.375 lb

FIG. 45. CASE CS-48, DIMENSIONS AND WEIGHT


1612
1602
61
E
RED
X
S
1608
S
M
C
X
X
GREEN
BLACK
ORANGE
C
Y
M
S
H.V.
L.V.
1610
Y
T
D
S
M
1604
1605
M
Y
R
Z
Z
A
A
44
45
54
55
53
47
56
57
A
A
1601
BLUE
C
D
W
Y
B
SEE NOTE
GREEN

CONNECTION	SIZE OF CONDUCTOR
A	.041"DIA. COPPER WIRE TINNED
B	# 8 AWG. S.I.-12249 (BLACK)
C	# 16AWG. $\frac{1}{64}$" RUBBER INSULATION K-7872345
D	# 14 AWG. $\frac{1}{32}$" RUBBER INSULATION K-7872345
M	UNIT PIECE OF APPARATUS
E	# 16AWG. $\frac{3}{64}$" RUBBER INSULATION (RED) K-7872345, PT-II.

CONNECTION	TERMINAL
X	K-7872831
Y	V-416575
Z	K-7870965 PT-2
W	V-1449899 "O" = $\frac{3}{32}$"
S	V-417591
T	V-1450858
R	K-7875573

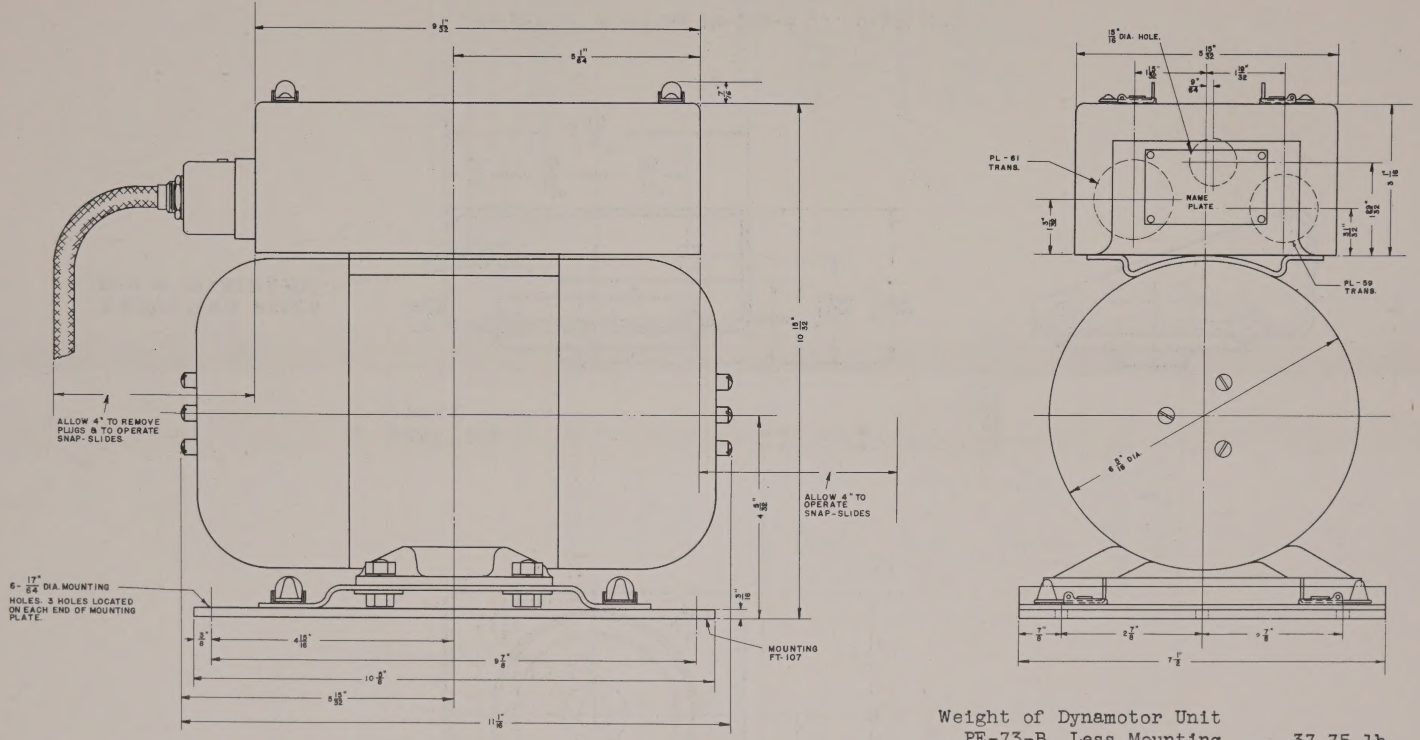
NOTE:- CUT ALL LEADS TO PROPER LENGTH SUCH THAT THEY TAKE THE POSITIONS SHOWN IN CONNECTION DIAGRAM WHEN TERMINAL BOARD IS SECURED IN PLACE.

FOR "B" CONNECTION USE EXCESS WIRE CUT FROM L.V. DYNAMOTOR LEADS.

TO PREVENT EXTERNAL BRAID OF "B" CONNECTIONS FROM FRAYING, ASSEMBLY CAP K-7870391 TO RELAY END OF EACH LEAD BEFORE SOLDERING TO TERMINAL.

REMOVE METAL IDENTIFICATION TAGS FROM THE FOUR DYNAMOTOR LEADS AFTER CONNECTIONS ARE MADE.

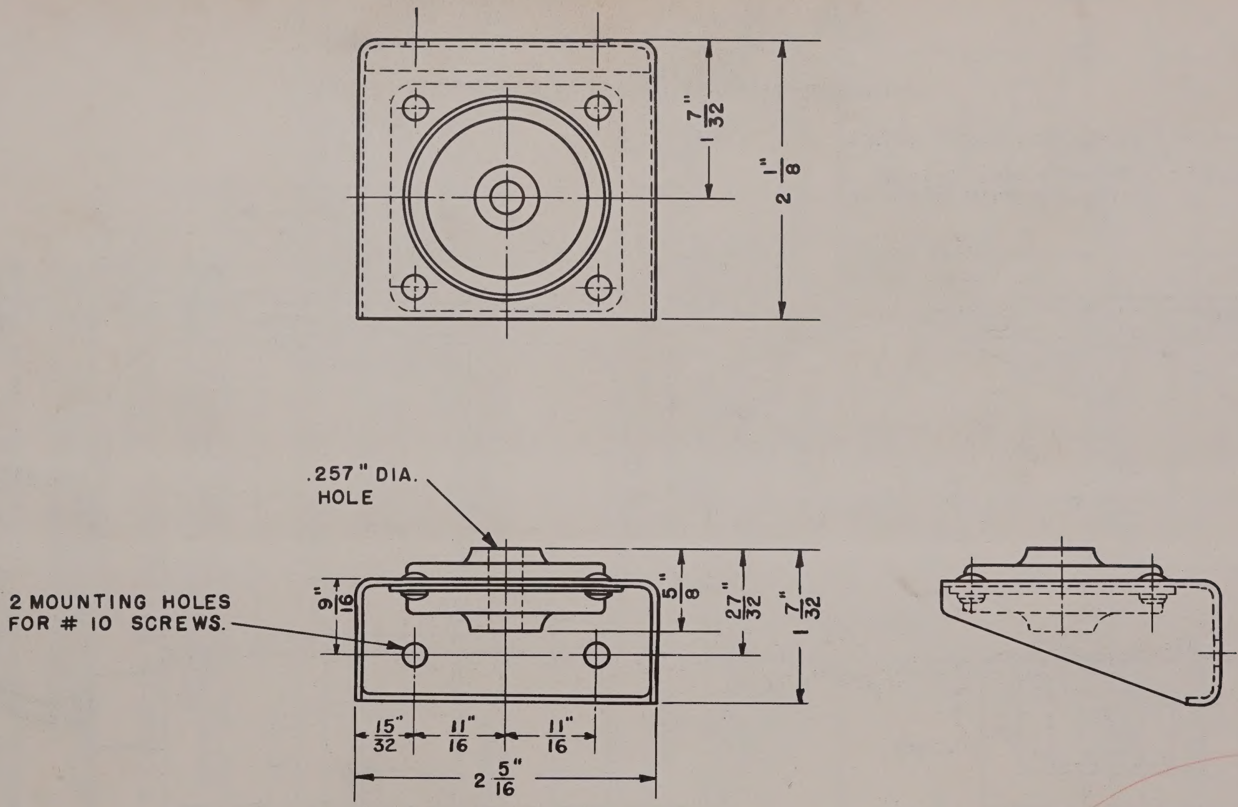
FIG. 46. DYNAMOTOR UNIT PE-73-B, CONNECTION DIAGRAM


9 1/32"
5 1/64"
7/16"
10 15/32"
ALLOW 4" TO REMOVE PLUGS & TO OPERATE SNAP-SLIDES.
ALLOW 4" TO OPERATE SNAP-SLIDES
4 5/32"
3/16"
6- 17/64" DIA. MOUNTING HOLES. 3 HOLES LOCATED ON EACH END OF MOUNTING PLATE.
MOUNTING FT-107
3/8"
4 15/16"
9 7/8"
10 5/8"
5 15/32"
11 1/16"
15/16" DIA. HOLE.
5 15/32"
1 15/32"
1 19/32"
9/64"
PL-61 TRANS.
NAME PLATE
PL-59 TRANS.
1 3/32"
3 1/16"
1 23/32"
31/32"
6 5/16" DIA.
7/8"
2 7/8"
2 7/8"
7 1/2"

Weight of Dynamotor Unit
  PE-73-B, Less Mounting .... 37.75 lb

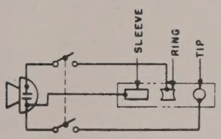
Weight of Mounting FT-107 ... 1.45 lb

FIG. 47. DYNAMOTOR UNIT PE-73-B, DIMENSIONS AND WEIGHT

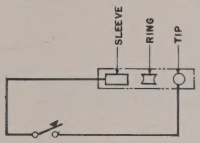

$1\frac{7}{32}$"
$2\frac{1}{8}$"
.257" DIA. HOLE
2 MOUNTING HOLES FOR # 10 SCREWS.
$\frac{9}{16}$"
$\frac{5}{8}$"
$\frac{27}{32}$"
$1\frac{7}{32}$"
$\frac{15}{32}$"
$\frac{11}{16}$"
$\frac{11}{16}$"
$2\frac{5}{16}$"

Weight of Mounting FT-115-B ... 0.195 lb

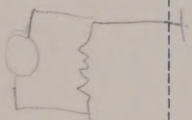
FIG. 48. MOUNTING F T-115-B, DIMENSIONS AND WEIGHT

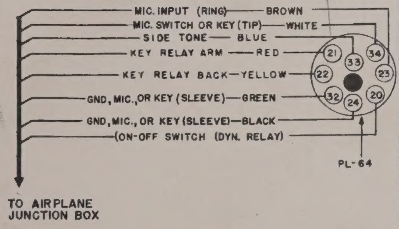

SLEEVE
RING
TIP

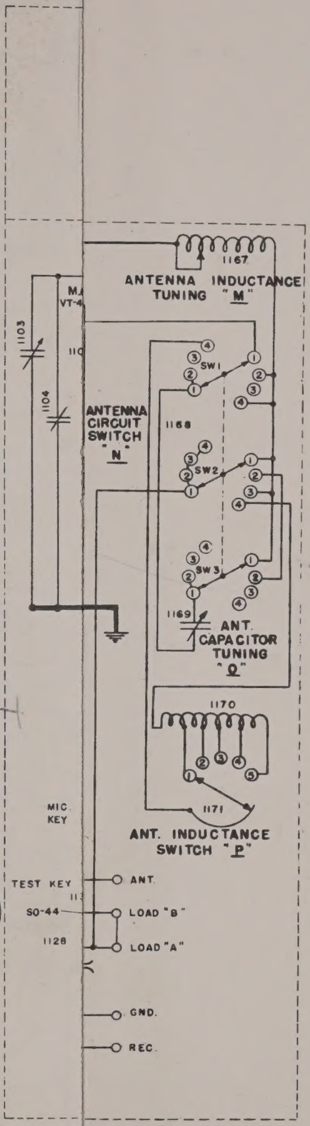
MICROPHONE CONNECTIONS

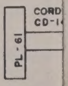

SLEEVE
RING
TIP

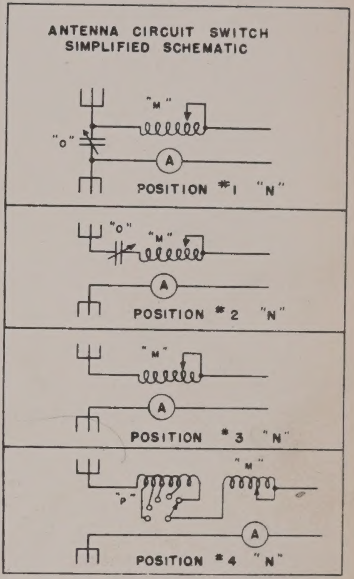
KEY CONNECTIONS

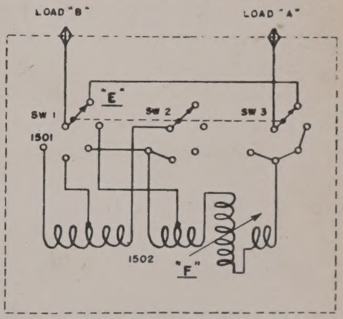



MIC. INPUT (RING)——BROWN
MIC. SWITCH OR KEY (TIP)——WHITE
SIDE TONE—— BLUE
KEY RELAY ARM ——RED
KEY RELAY BACK—YELLOW
GND, MIC., OR KEY (SLEEVE)—GREEN
GND, MIC., OR KEY (SLEEVE)—BLACK
(ON-OFF SWITCH (DYN. RELAY)
21
33
34
22
23
32
24
20
PL-64
TO AIRPLANE JUNCTION BOX

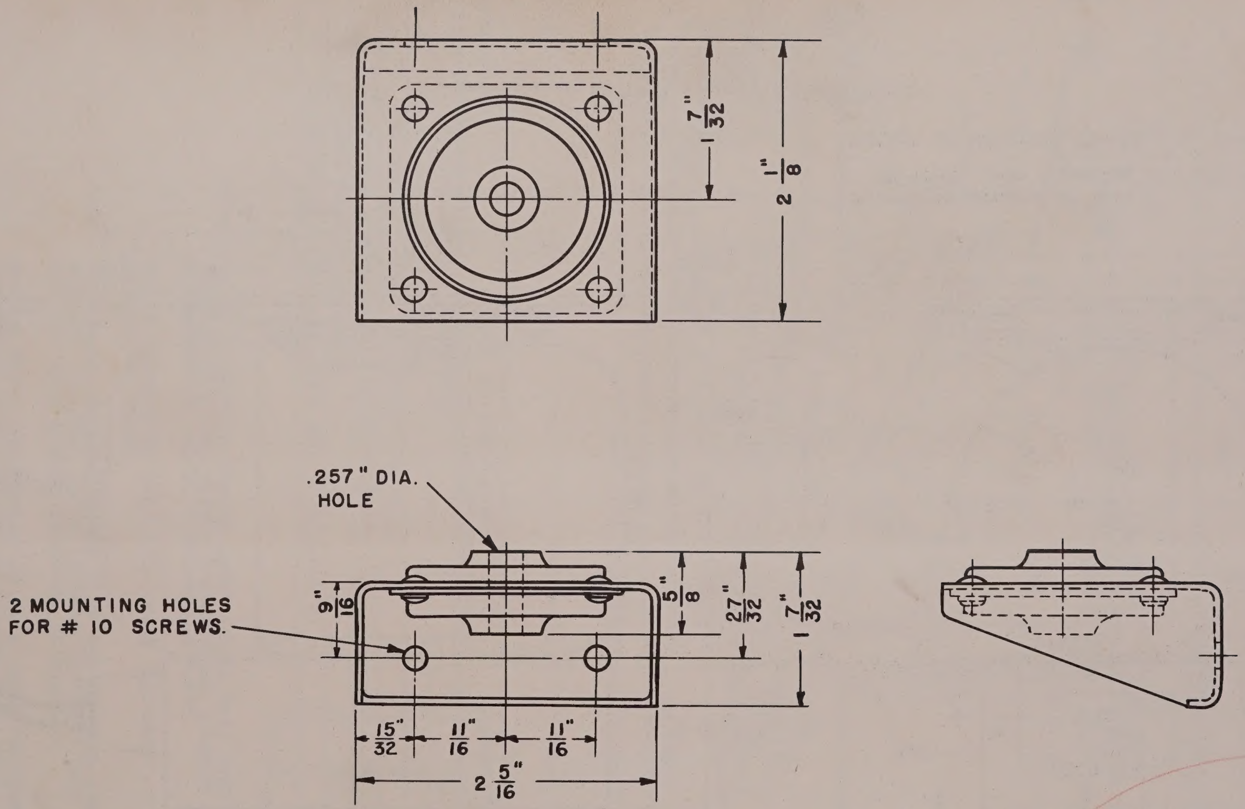

1167
ANTENNA INDUCTANCE
TUNING "M"
MA
VT-4
1103
110
1104
ANTENNA CIRCUIT SWITCH "N"
1168
SW1
SW2
SW3
1
2
3
4
1169
ANT. CAPACITOR TUNING "O"
1170
1171
ANT. INDUCTANCE SWITCH "P"
MIC. KEY
TEST KEY
11
SO-44
1128
ANT.
LOAD "B"
LOAD "A"
GND.
REC.


CORD
CD-1
PL-61


ANTENNA CIRCUIT SWITCH
SIMPLIFIED SCHEMATIC
"M"
"O"
A
POSITION #1 "N"
"O"
"M"
A
POSITION #2 "N"
"M"
A
POSITION #3 "N"
"P"
"M"
A
POSITION #4 "N"


LOAD "B"
LOAD "A"
"E"
SW 1
SW 2
SW 3
1501
1502
"F"

ANTENNA TUNING UNIT BC-306-A


1 7/32"
2 1/8"
.257" DIA. HOLE
2 MOUNTING HOLES FOR # 10 SCREWS.
9/16"
5/8"
27/32"
1 7/32"
15/32"
11/16"
11/16"
2 5/16"

Weight of Mounting FT-115-B ... 0.195 lb

FIG. 48. MOUNTING F T-115-B, DIMENSIONS AND WEIGHT

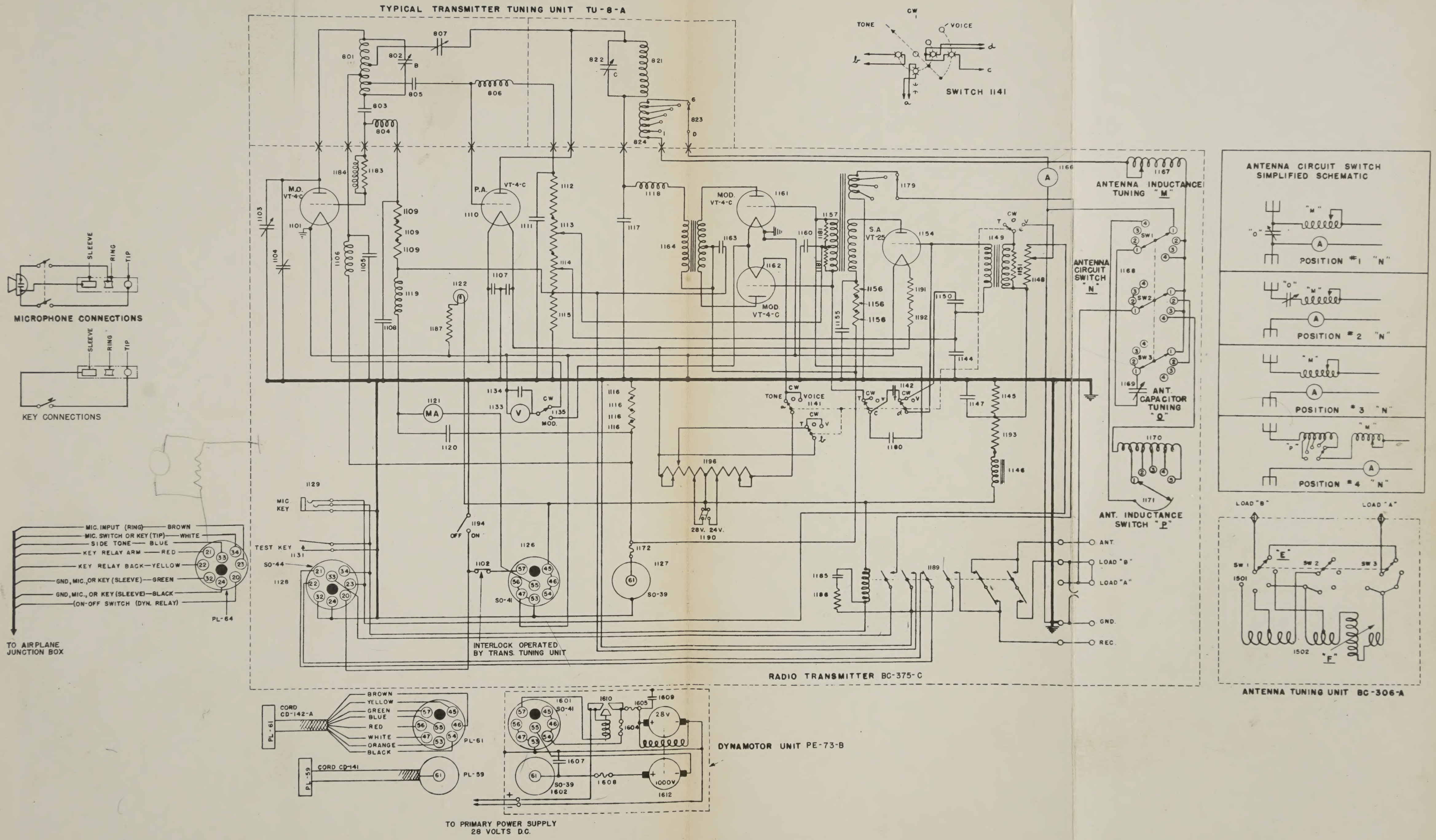
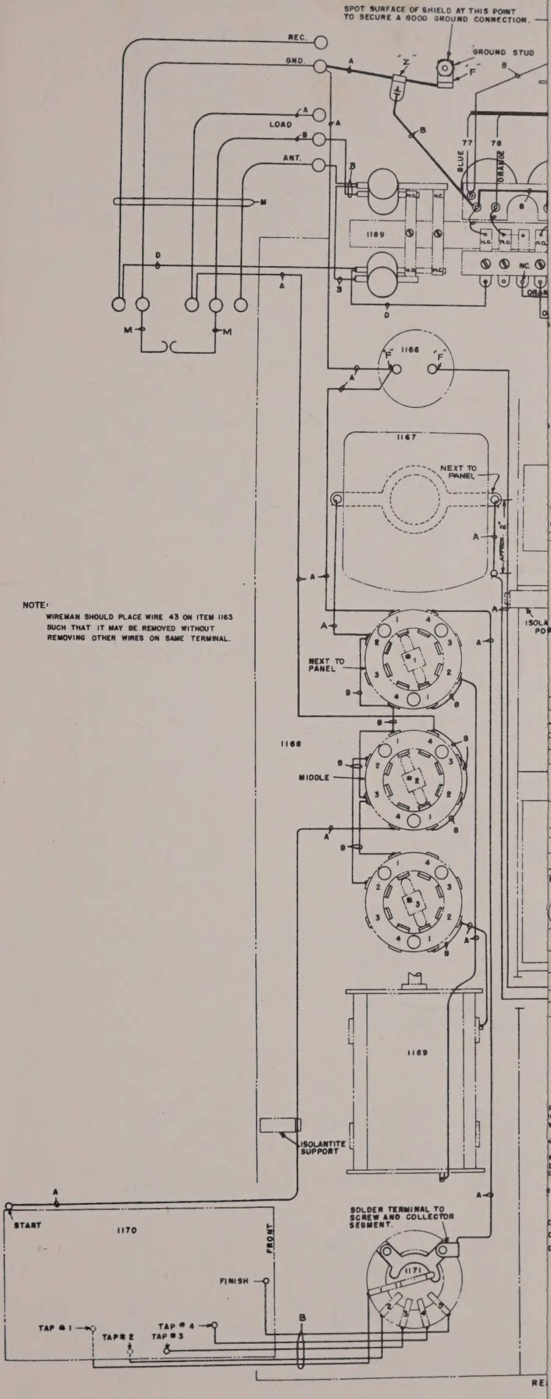
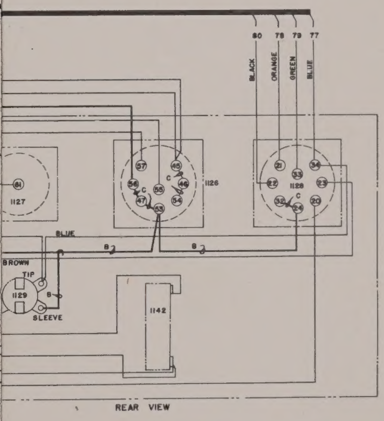

TYPICAL TRANSMITTER TUNING UNIT TU-8-A
801
802
807
805
806
803
804
821
822
823
824
SWITCH 1141
TONE
CW
VOICE
M.O. VT-4-C
1101
1103
1104
1106
1105
1183
1184
1108
1109
1119
P.A. VT-4-C
1110
1111
1112
1113
1114
1115
1107
1122
1187
1117
1118
MOD. VT-4-C
1161
1162
MOD. VT-4-C
1163
1164
1157
1160
1181
1155
1156
S.A VT-25
1154
1191
1192
1150
1144
1149
1151
1148
1179
1166
1167
ANTENNA INDUCTANCE TUNING "M"
ANTENNA CIRCUIT SWITCH "N"
1168
SW1
SW2
SW3
1169
ANT. CAPACITOR TUNING "O"
1170
1171
ANT. INDUCTANCE SWITCH "P"
1121
MA
1120
1134
1133
V
1135
MOD.
1116
1141
1142
1180
1147
1145
1193
1146
1196
28V. 24V.
1190
1129
MIC KEY
TEST KEY
1131
SO-44
1128
1194
OFF
ON
1102
1126
SO-41
1172
1127
SO-39
1165
1186
1189
ANT.
LOAD "B"
LOAD "A"
GND.
REC.
INTERLOCK OPERATED BY TRANS. TUNING UNIT
RADIO TRANSMITTER BC-375-C
MICROPHONE CONNECTIONS
SLEEVE
RING
TIP
KEY CONNECTIONS
MIC. INPUT (RING) — BROWN
MIC. SWITCH OR KEY (TIP) — WHITE
SIDE TONE — BLUE
KEY RELAY ARM — RED
KEY RELAY BACK — YELLOW
GND, MIC., OR KEY (SLEEVE) — GREEN
GND, MIC., OR KEY (SLEEVE) — BLACK
(ON-OFF SWITCH (DYN. RELAY)
PL-64
TO AIRPLANE JUNCTION BOX
ANTENNA CIRCUIT SWITCH SIMPLIFIED SCHEMATIC
POSITION #1 "N"
POSITION #2 "N"
POSITION #3 "N"
POSITION #4 "N"
LOAD "B"
LOAD "A"
SW 1
SW 2
SW 3
1501
1502
"E"
"F"
ANTENNA TUNING UNIT BC-306-A
CORD CD-142-A
PL-61
BROWN
YELLOW
GREEN
BLUE
RED
WHITE
ORANGE
BLACK
CORD CD-141
PL-59
1601
SO-41
1610
1605
1609
1604
28V
1607
1608
SO-39
1602
1000V
1612
DYNAMOTOR UNIT PE-73-B
TO PRIMARY POWER SUPPLY 28 VOLTS D.C.

FIG. 49. RADIO TRANSMITTER BC-375-C, SCHEMATIC DIAGRAM


SPOT SURFACE OF SHIELD AT THIS POINT TO SECURE A GOOD GROUND CONNECTION.
GROUND STUD
REC.
GND.
LOAD
ANT.
BLUE
ORANGE
1189
1166
1167
NEXT TO PANEL
APPROX. 2"
O 1149 TERMINAL # 2
O GND.
ISOLA
PO
NEXT TO PANEL
1168
MIDDLE
#1
#2
#3
1169
ISOLANTITE SUPPORT
START
1170
FRONT
FINISH
TAP # 1
TAP # 2
TAP # 3
TAP # 4
SOLDER TERMINAL TO SCREW AND COLLECTOR SEGMENT.
1171
RE

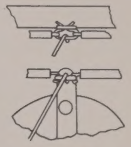
NOTE:
WIREMAN SHOULD PLACE WIRE 43 ON ITEM 1163 SUCH THAT IT MAY BE REMOVED WITHOUT REMOVING OTHER WIRES ON SAME TERMINAL.


80
78
79
77
BLACK
ORANGE
GREEN
BLUE
1127
1126
1128
BLUE
BROWN
TIP
1129
SLEEVE
1142

REAR VIEW

CONNECTION	SIZE OF CONDUCTOR
A	.102" DIA. COPPER WIRE TINNED
B	.081" DIA. COPPER WIRE TINNED
C	.041" DIA. COPPER WIRE TINNED
D	.081" DIA. COPPER WIRE TINNED
E COLORED	# 14AWG. STRANDS 26/.0126" $^{1}/_{32}$" RUBBER INSULATION G.E. SPECS. K-7872345
UNMARKED COLORED	# 16AWG. STRANDS 16/.0126" $^{1}/_{64}$" RUBBER INSULATION G.E. SPECS. K-7872345
M	UNIT PIECE OF APPARATUS
K	# 16AWG. 16/.0126 STRANDS $^{1}/_{64}$" RUBBER INSULATION G.E. SPECS. K-7872345 PT-11.

REFERENCE DRAWING	
SCHEMATIC DIAGRAM	T-7661019



AT POINTS MARKED "X" USE COTTER PIN K-7870428. INSERT IN HOLE IN CONTACT SPRING AND BEND OVER. CUT OFF EXCESS LENGTH SOLDER CONNECTIONS TO LOOP IN COTTER PIN AND COTTER PIN TO CONTACT SPRING OF TUBE SOCKET.

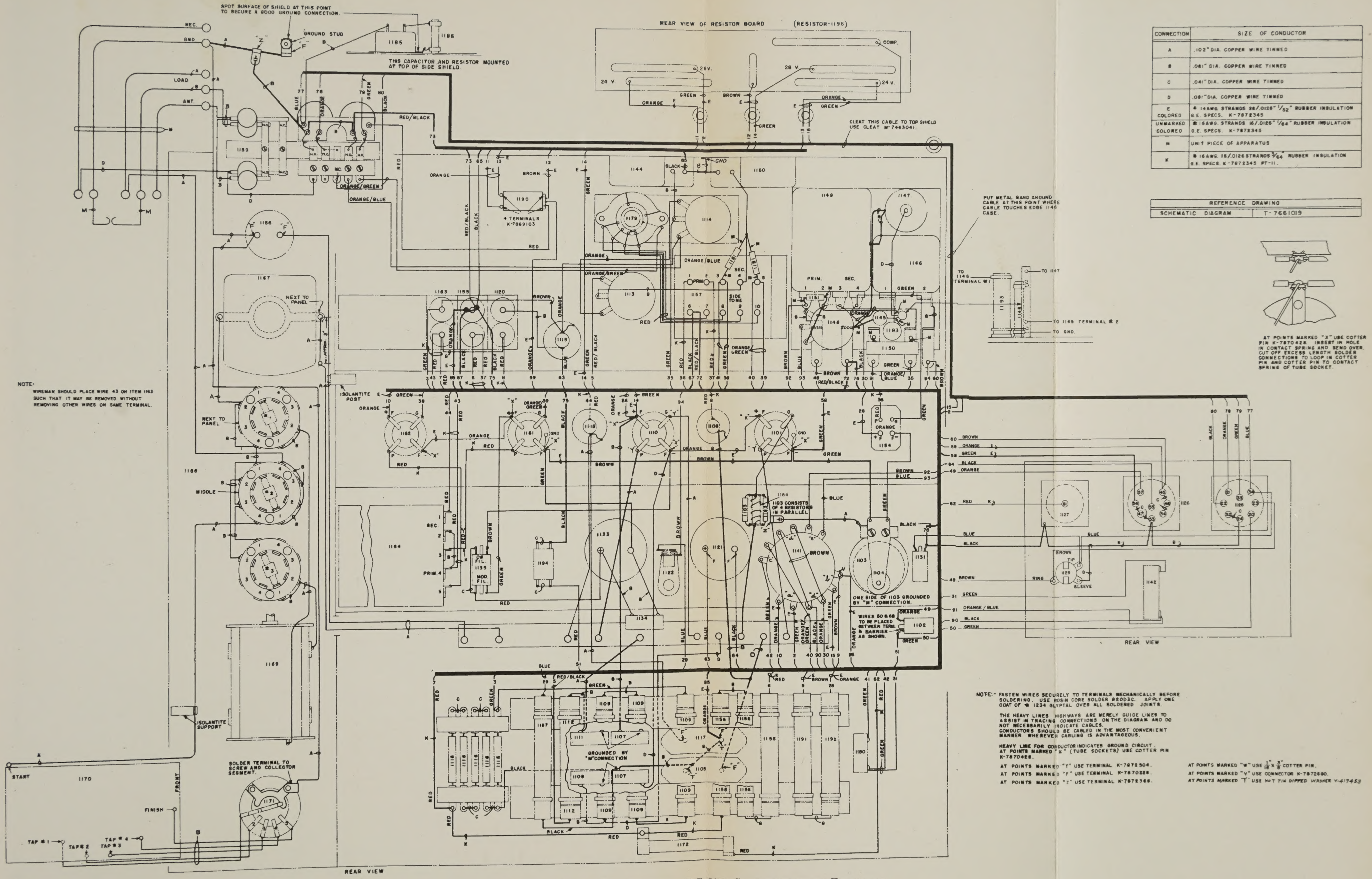
RELY TO TERMINALS MECHANICALLY BEFORE
OSIN CORE SOLDER 820D3C. APPLY ONE
YPTAL OVER ALL SOLDERED JOINTS.

HIGHWAYS ARE MERELY GUIDE LINES TO
CONNECTIONS ON THE DIAGRAM AND DO
NDICATE CABLES.
D BE CABLED IN THE MOST CONVENIENT
CABLING IS ADVANTAGEOUS.

DUCTOR INDICATES GROUND CIRCUIT.
X" (TUBE SOCKETS) USE COTTER PIN

D "T" USE TERMINAL K-7872504.
D "F" USE TERMINAL K-7870226.
D "Z" USE TERMINAL K-7872366.

AT POINTS MARKED "W" USE $\frac{1}{16}$" X $\frac{3}{8}$" COTTER PIN.
AT POINTS MARKED "V" USE CONNECTOR K-7872680.
AT POINTS MARKED "Y" USE NOT TIN DIPPED WASHER V-417453


REC.
GND
LOAD
ANT.
GROUND STUD
1185
1186
1189
1166
1167
NEXT TO PANEL
1168
MIDDLE
1169
ISOLANTITE SUPPORT
1170
START
FINISH
FRONT
1171
TAP # 1
TAP # 2
TAP # 3
TAP # 4
REAR VIEW
24 V.
28 V.
COMP.
1190
4 TERMINALS K-7669103
1144
1160
1179
1114
1149
1147
1146
1113
1157
SIDE TONE
PRIM.
SEC.
1148
1145
1193
1150
1163
1155
1120
1119
ISOLANTITE POST
1162
1161
1118
1110
1108
1101
1154
1164
1135
1194
1133
1122
1121
1134
1141
1103
1104
1131
1102
1109
1112
1111
1107
1108
1106
1105
1117
1156
1191
1192
1180
1172
1127
1126
1128
1129
TIP
RING
SLEEVE
1142
REAR VIEW
TO 1146 TERMINAL # 1
TO 1147
TO 1149 TERMINAL # 2
TO GND.
1193
1187

SPOT SURFACE OF SHIELD AT THIS POINT TO SECURE A GOOD GROUND CONNECTION.

THIS CAPACITOR AND RESISTOR MOUNTED AT TOP OF SIDE SHIELD.

REAR VIEW OF RESISTOR BOARD (RESISTOR-1196)

CLEAT THIS CABLE TO TOP SHIELD USE CLEAT M-7463041.

PUT METAL BAND AROUND CABLE AT THIS POINT WHERE CABLE TOUCHES EDGE 1146 CASE.

NOTE: WIREMAN SHOULD PLACE WIRE 43 ON ITEM 1163 SUCH THAT IT MAY BE REMOVED WITHOUT REMOVING OTHER WIRES ON SAME TERMINAL.

1103 CONSISTS OF 4 RESISTORS IN PARALLEL

ONE SIDE OF 1103 GROUNDED BY "M" CONNECTION.

WIRES 50 & 68 TO BE PLACED BETWEEN TERM. & BARRIER AS SHOWN.

GROUNDED BY "M" CONNECTION

SOLDER TERMINAL TO SCREW AND COLLECTOR SEGMENT.

CONNECTION	SIZE OF CONDUCTOR
A	.102" DIA. COPPER WIRE TINNED
B	.081" DIA. COPPER WIRE TINNED
C	.041" DIA. COPPER WIRE TINNED
D	.081" DIA. COPPER WIRE TINNED
E COLORED	# 14 AWG. STRANDS 26/.0126" 1/32" RUBBER INSULATION G.E. SPECS. K-7872345
UNMARKED COLORED	# 16 AWG. STRANDS 16/.0126" 1/64" RUBBER INSULATION G.E. SPECS. K-7872345
M	UNIT PIECE OF APPARATUS
K	# 16 AWG. 16/.0126 STRANDS 3/64" RUBBER INSULATION G.E. SPECS. K-7872345 PT-11.

REFERENCE DRAWING	
SCHEMATIC DIAGRAM	T-7661019

AT POINTS MARKED "X" USE COTTER PIN K-7870428. INSERT IN HOLE IN CONTACT SPRING AND BEND OVER. CUT OFF EXCESS LENGTH SOLDER CONNECTIONS TO LOOP IN COTTER PIN AND COTTER PIN TO CONTACT SPRING OF TUBE SOCKET.

NOTE:- FASTEN WIRES SECURELY TO TERMINALS MECHANICALLY BEFORE SOLDERING. USE ROSIN CORE SOLDER 820D3C. APPLY ONE COAT OF # 1234 GLYPTAL OVER ALL SOLDERED JOINTS.

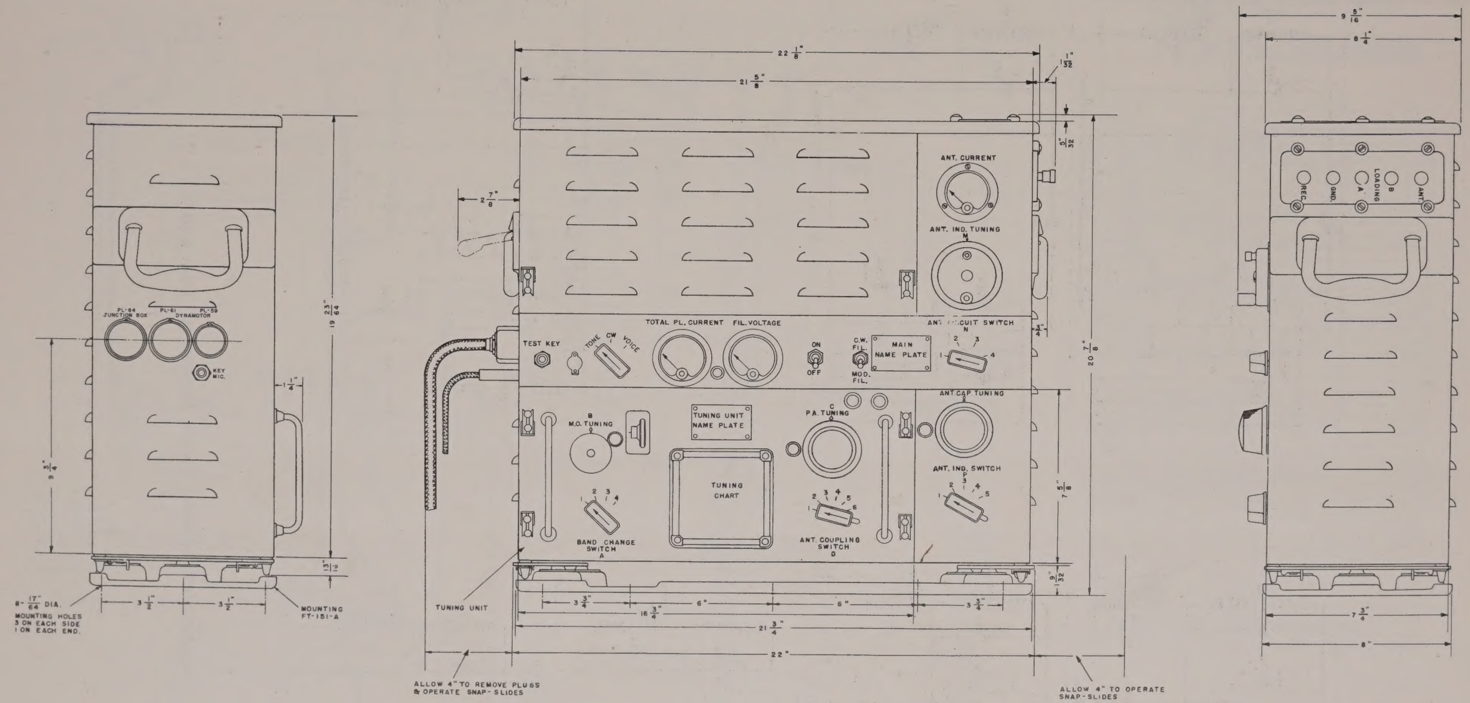
THE HEAVY LINES HIGHWAYS ARE MERELY GUIDE LINES TO ASSIST IN TRACING CONNECTIONS ON THE DIAGRAM AND DO NOT NECESSARILY INDICATE CABLES.
CONDUCTORS SHOULD BE CABLED IN THE MOST CONVENIENT MANNER WHEREVER CABLING IS ADVANTAGEOUS.

HEAVY LINE FOR CONDUCTOR INDICATES GROUND CIRCUIT.
AT POINTS MARKED "X" (TUBE SOCKETS) USE COTTER PIN K-7870428.

AT POINTS MARKED "T" USE TERMINAL K-7872504.
AT POINTS MARKED "F" USE TERMINAL K-7870228.
AT POINTS MARKED "Z" USE TERMINAL K-7872368.

AT POINTS MARKED "W" USE $\frac{1}{16}$" X $\frac{3}{8}$" COTTER PIN.
AT POINTS MARKED "V" USE CONNECTOR K-7872680.
AT POINTS MARKED "Y" USE HOT TIN DIPPED WASHER V-417453

FIG. 50. RADIO TRANSMITTER BC-375-C, CONNECTION DIAGRAM


PL-64 JUNCTION BOX
PL-61 DYNAMOTOR
PL-59
KEY MIC.
8-17/64" DIA. MOUNTING HOLES 3 ON EACH SIDE 1 ON EACH END.
MOUNTING FT-151-A
TUNING UNIT
ALLOW 4" TO REMOVE PLUGS & OPERATE SNAP-SLIDES
ALLOW 4" TO OPERATE SNAP-SLIDES
TEST KEY
TONE
CW
VOICE
TOTAL PL. CURRENT
FIL. VOLTAGE
ON
OFF
C.W. FIL.
MOD. FIL.
MAIN NAME PLATE
ANT. CIRCUIT SWITCH N
ANT. CURRENT
ANT. IND. TUNING M
B M.O. TUNING
TUNING UNIT NAME PLATE
TUNING CHART
C P.A. TUNING
ANT. CAP. TUNING
ANT. IND. SWITCH P
BAND CHANGE SWITCH A
ANT. COUPLING SWITCH D
ANT.
B
LOADING
A
GND.
REC.
22 1/8"
21 5/8"
1/32"
5/32"
3/4"
20 7/8"
7 5/8"
9/32"
2 7/8"
3 3/4"
16 3/4"
6"
6"
3 3/4"
21 3/4"
22"
19 23/64"
9 3/4"
1 1/4"
13/32"
3 1/2"
3 1/2"
9 5/16"
8 1/4"
7 3/4"
8"

Radio Transmitter BC-375-C, without Mounting, Tuning Unit, and Tubes	49 lb
Mounting FT-151-A	3.75 lb
One Set of Tubes, Consisting of Four Tubes VT-4-C, and One Tube VT-25	2 lb
Transmitter Tuning Unit TU-5-A	14.437 lb
Transmitter Tuning Unit TU-6-A	12.437 lb
Transmitter Tuning Unit TU-7-A	11.687 lb
Transmitter Tuning Unit TU-8-A	11.437 lb
Transmitter Tuning Unit TU-9-A	11.437 lb
Transmitter Tuning Unit TU-10-A	11.437 lb
Transmitter Tuning Unit TU-22-A	12.250 lb

FIG. 51 RADIO TRANSMITTER BC-375-C, DIMENSIONS AND WEIGHT

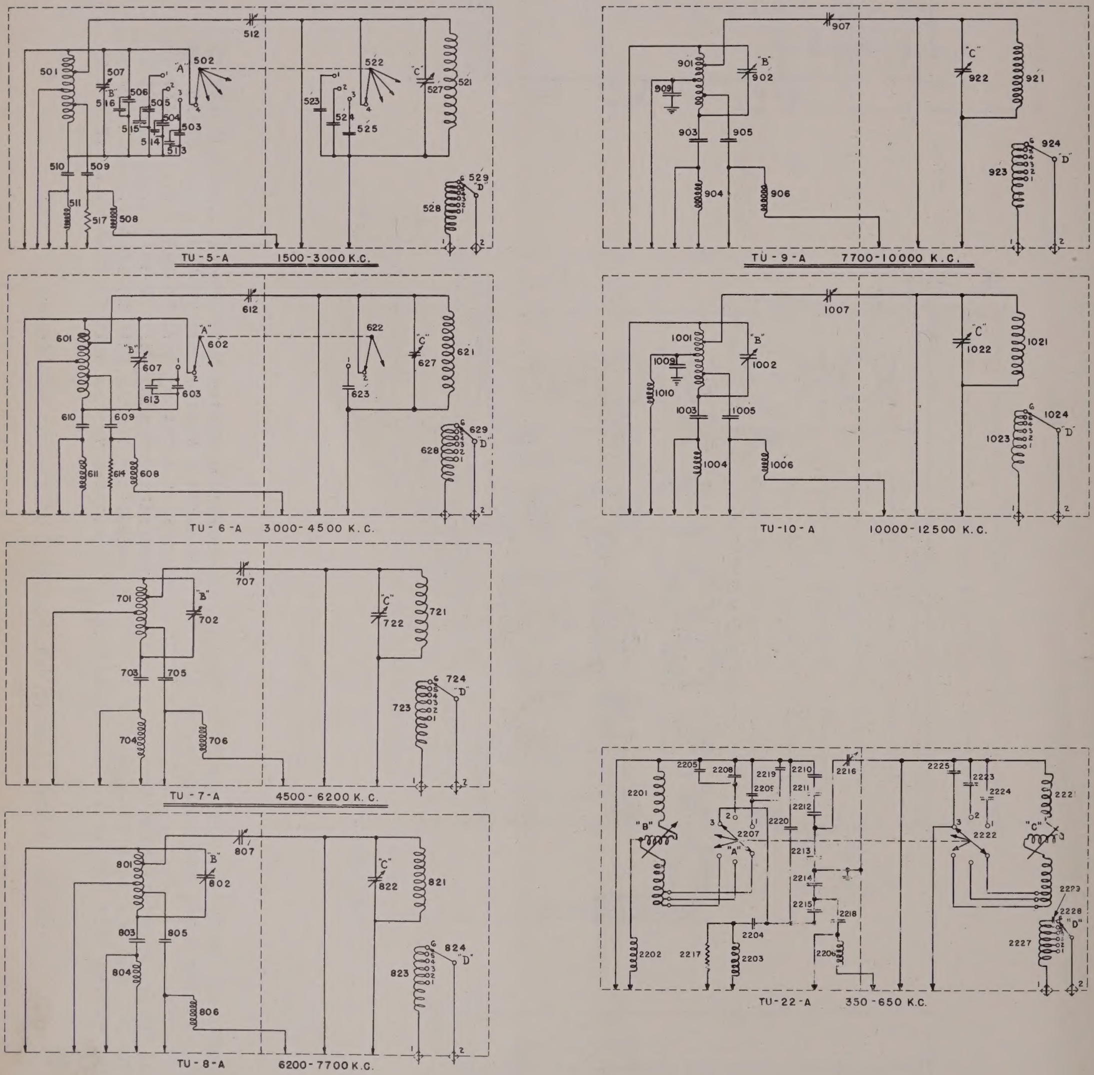
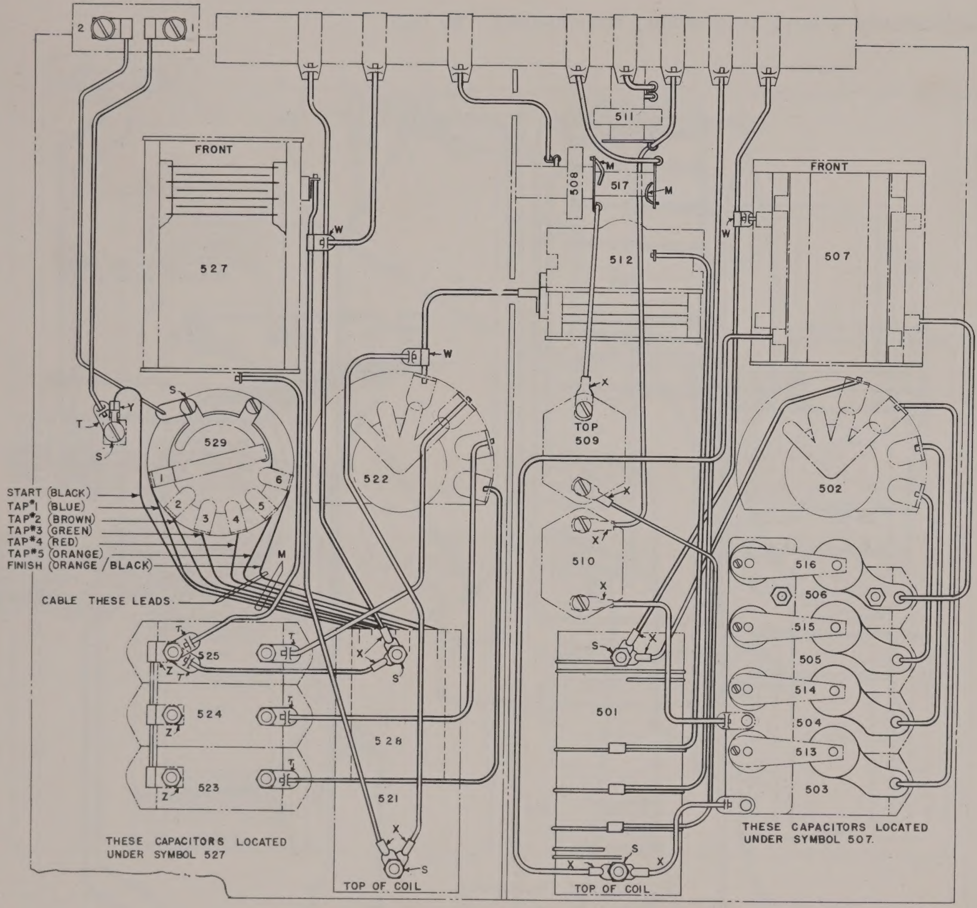

TU-5-A 1500-3000 K.C.
501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517
521 522 523 524 525 527 528 529
"A" "B" "C" "D"
TU-9-A 7700-10000 K.C.
901 902 903 904 905 906 907 909 921 922 923 924
TU-6-A 3000-4500 K.C.
601 602 603 607 608 609 610 611 612 613 614 621 622 623 627 628 629
TU-10-A 10000-12500 K.C.
1001 1002 1003 1004 1005 1006 1007 1009 1010 1021 1022 1023 1024
TU-7-A 4500-6200 K.C.
701 702 703 704 705 706 707 721 722 723 724
TU-8-A 6200-7700 K.C.
801 802 803 804 805 806 807 821 822 823 824
TU-22-A 350-650 K.C.
2201 2202 2203 2204 2205 2206 2207 2208 2209 2210 2211 2212 2213 2214 2215 2216 2217 2218 2219 2220
2221 2222 2223 2224 2225 2227 2228 2229
1 2

FIG. 52. TRANSMITTER TUNING UNITS, SCHEMATIC DIAGRAM


2
1
FRONT
527
W
W
511
508
517
M
M
512
FRONT
507
W
TOP
509
X
X
X
510
X
S
529
T
Y
S
522
502
1
2
3
4
5
6
START (BLACK)
TAP#1 (BLUE)
TAP#2 (BROWN)
TAP#3 (GREEN)
TAP#4 (RED)
TAP#5 (ORANGE)
FINISH (ORANGE/BLACK)
M
CABLE THESE LEADS.
T
525
Z
T
T
X
S
524
Z
T
528
523
Z
T
521
X
S
TOP OF COIL
THESE CAPACITORS LOCATED UNDER SYMBOL 527
S
X
501
516
506
515
505
514
504
513
503
THESE CAPACITORS LOCATED UNDER SYMBOL 507.
X
S
X
TOP OF COIL

NOTE FOR SOLDERING :-
WIRE TO BE FASTENED MECHANICALLY TO TERMINALS BEFORE SOLDERING. USE ROSIN CORE SOLDER B20D3C.

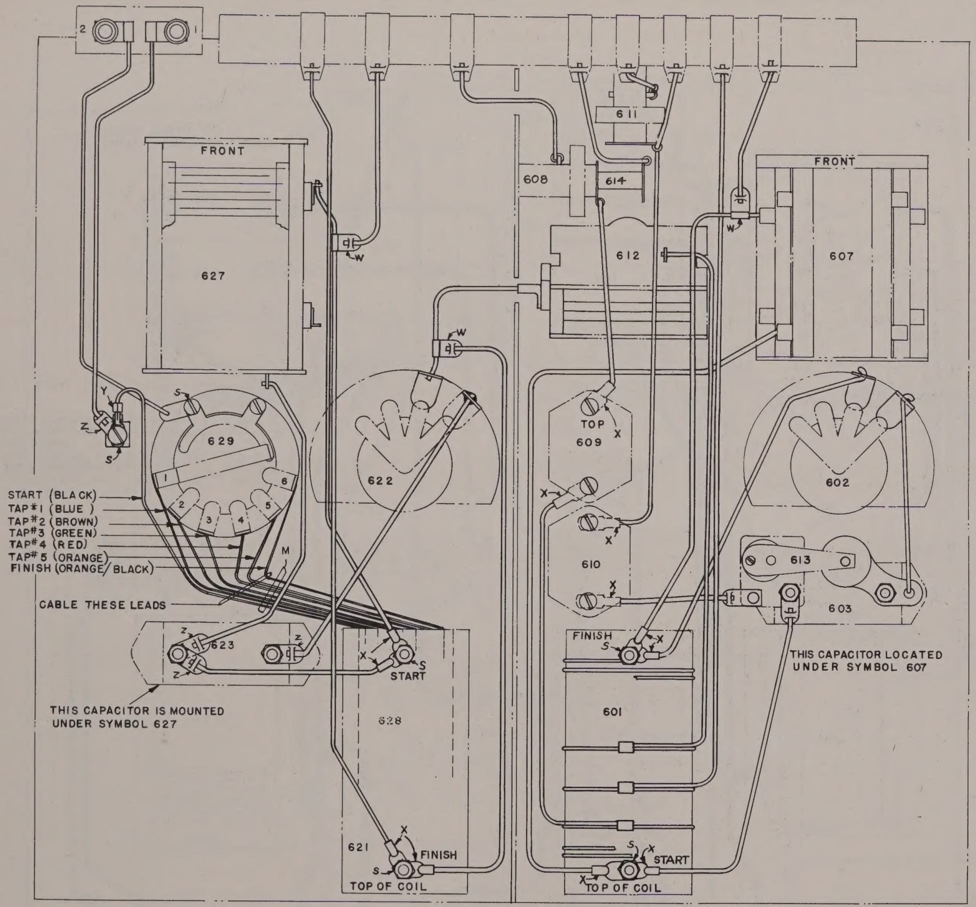
THERE SHALL BE NO SHARP POINTS LEFT AFTER UNIT IS WIRED EITHER FROM LUMPS OF SOLDER OR IRREGULARLY CUT WIRE ENDS.

SYMBOL	NAME OF UNIT	
501	M.O. TANK INDUCTANCE	
502	M.O. BAND CHANGE SWITCH	
503	M.O. FIXED TANK CAPACITOR	
504	" " " "	
505	" " " "	
506	" " " "	
507	M.O. VARIABLE TANK CAPACITOR	
508	P.A. GRID CHOKE	
509	" " BLOCKING CAPACITOR	
510	M.O. " " "	
511	" " CHOKE	
512	NEUTRALIZING CAPACITOR	
513	M.O. TANK COMPENSATING CAP.	
514	" " " "	
515	" " " "	
516	" " " "	
517	M.O. GRID PARASITIC RESISTOR	
521	P.A. TANK INDUCTANCE	
522	P.A. BAND CHANGE SWITCH	
523	P.A. FIXED TANK CAPACITOR	
524	" " " "	
525	" " " "	
527	P.A. VARIABLE TANK CAPACITOR	
528	ANT. COUPLING COIL	
529	" " SWITCH	

CONNECTOR	DESCRIPTION
M	UNIT PIECE OF APPARATUS
NOT MARKED	.102" DIA. COPPER WIRE TINNED.

NOTE :- AT POINTS MARKED "X" USE TERM. V-1444451
" " " "Z" " " K-7872717
" " " "Y" " " V-2454945
" " " "W" " " K-7872368
" " " "T" " " K-7872305
" " " "S" SOLDER COMPLETE JOINT TOGETHER

FIG. 53. TRANSMITTER TUNING UNIT TU-5-A, CONNECTION DIAGRAM


2
1
FRONT
627
608
614
611
612
FRONT
607
W
W
W
W
629
622
602
TOP
609
X
610
613
603
Y
Z
S
1
2
3
4
5
6
M
START (BLACK)
TAP#1 (BLUE)
TAP#2 (BROWN)
TAP#3 (GREEN)
TAP#4 (RED)
TAP#5 (ORANGE)
FINISH (ORANGE/BLACK)
CABLE THESE LEADS
Z
623
THIS CAPACITOR IS MOUNTED UNDER SYMBOL 627
START
628
621
FINISH
TOP OF COIL
FINISH
601
START
TOP OF COIL
THIS CAPACITOR LOCATED UNDER SYMBOL 607

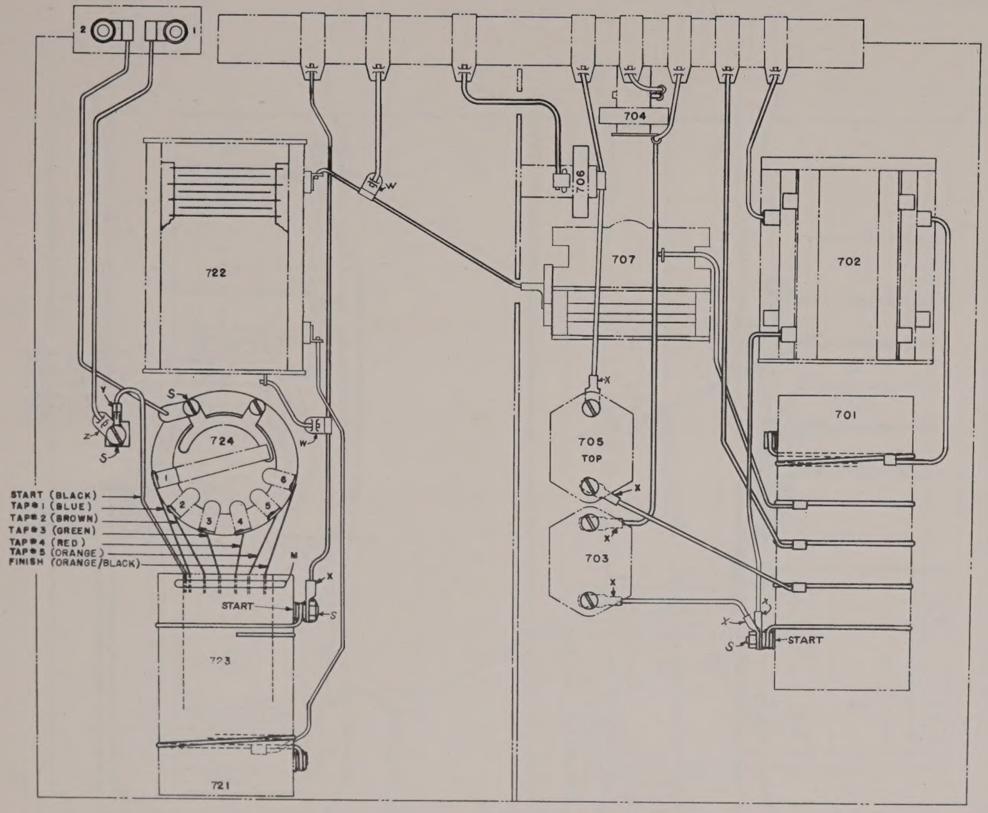
NOTE:
THERE SHALL BE NO SHARP POINTS LEFT AFTER UNIT IS WIRED EITHER FROM LUMPS OF SOLDER OR IRREGULARLY CUT WIRE ENDS.
WIRE TO BE FASTENED MECHANICALLY TO TERMINALS BEFORE SOLDERING
USE ROSIN CORE SOLDER B20D3C

SYMBOL	NAME OF UNIT	
601	M.O. TANK INDUCTANCE	
602	M.O. BAND CHANGE SWITCH	
603	M.O. FIXED TANK CAPACITOR	
607	M.O. VARIABLE TANK CAPACITOR	
608	P.A. GRID CHOKE	
609	P.A. GRID BLOCKING CAPACITOR	
610	M.O. GRID BLOCKING CAPACITOR	
611	M.O. GRID CHOKE	
612	NEUTRALIZING CAPACITOR	
613	MO. COMPENSATING CAPACITOR	
614	P.A. GRID PARASITIC RESISTOR	
621	P.A. TANK INDUCTANCE	
622	P.A. BAND CHANGE SWITCH	
623	P.A. FIXED TANK CAPACITOR	
627	P.A. VARIABLE TANK CAPACITOR	
628	ANTENNA COUPLING COIL	
629	ANTENNA COUPLING SWITCH	

CONNECTION	SIZE OF CONNECTOR
M	UNIT PIECE OF APPARATUS
NOT MARKED	.102 DIA. COPPER WIRE TINNED

NOTE: AT POINTS MARKED "X" USE TERM V-1444451
" " " "Z" " " K-7872305
" " " "Y" " " V-2454945
" " " "W" " " K-7872368
" " " "S" SOLDER COMPLETE JOINT TOGETHER.

Fig. 54. Transmitter Tuning Unit TU-6-A, Connection Diagram



2
1
722
724
723
721
START (BLACK)
TAP#1 (BLUE)
TAP#2 (BROWN)
TAP#3 (GREEN)
TAP#4 (RED)
TAP#5 (ORANGE)
FINISH (ORANGE/BLACK)
START
M
X
Y
Z
W
S
704
706
707
705
TOP
703
702
701
START

NOTE:
AT POINTS MARKED "X" USE TERM. V-1444451
" " " "Z" " " K-7872305
" " " "Y" " " V-2454945
" " " "W" " " K-7872368
" " " "S" SOLDER COMPLETE JOINT TOGETHER.

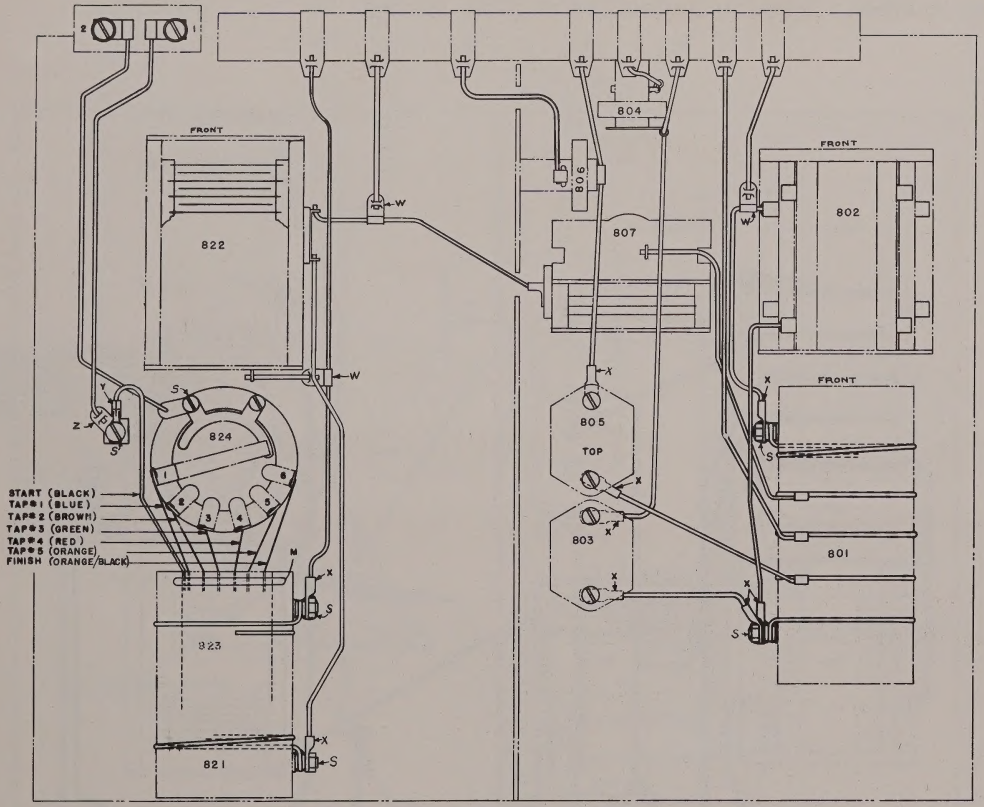
NOTE:-
THERE SHALL BE NO SHARP POINTS LEFT AFTER UNIT IS WIRED EITHER FROM LUMPS OF SOLDER OR IRREGULARLY CUT WIRE ENDS.

WIRE TO BE FASTENED MECHANICALLY TO TERMINALS BEFORE SOLDERING USE ROSIN CORE SOLDER B20D3B

SYMBOL	NAME OF UNIT	
UNIT #7		
701	M.O. TANK INDUCTANCE	
702	M.O. TANK CAPACITOR	
703	M.O. GRID BLOCKING CAPACITOR	
704	M.O. GRID CHOKE	
705	P.A. GRID BLOCKING CAPACITOR	
706	P.A. GRID CHOKE	
707	NEUTRALIZING CAPACITOR	
721	P.A. TANK INDUCTANCE	
722	P.A. TANK CAPACITOR	
723	ANT. COUPLING COIL	
724	ANT. COUPLING SWITCH	

CONNECTION	SIZE OF CONNECTOR
M	SPECIFIED ON MECHANICAL DRAWING
NOT MARKED	COPPER WIRE TINNED .102 DIA.

FIG. 55. TRANSMITTER TUNING UNIT TU-7-A, CONNECTION DIAGRAM



2
1
FRONT
822
804
806
807
W
W
W
Y
Z
S
S
S
824
1
2
3
4
5
6
START (BLACK)
TAP#1 (BLUE)
TAP#2 (BROWN)
TAP#3 (GREEN)
TAP#4 (RED)
TAP#5 (ORANGE)
FINISH (ORANGE/BLACK)
M
X
S
823
X
S
821
X
805
TOP
X
X
803
X
FRONT
802
FRONT
X
S
801
X
S

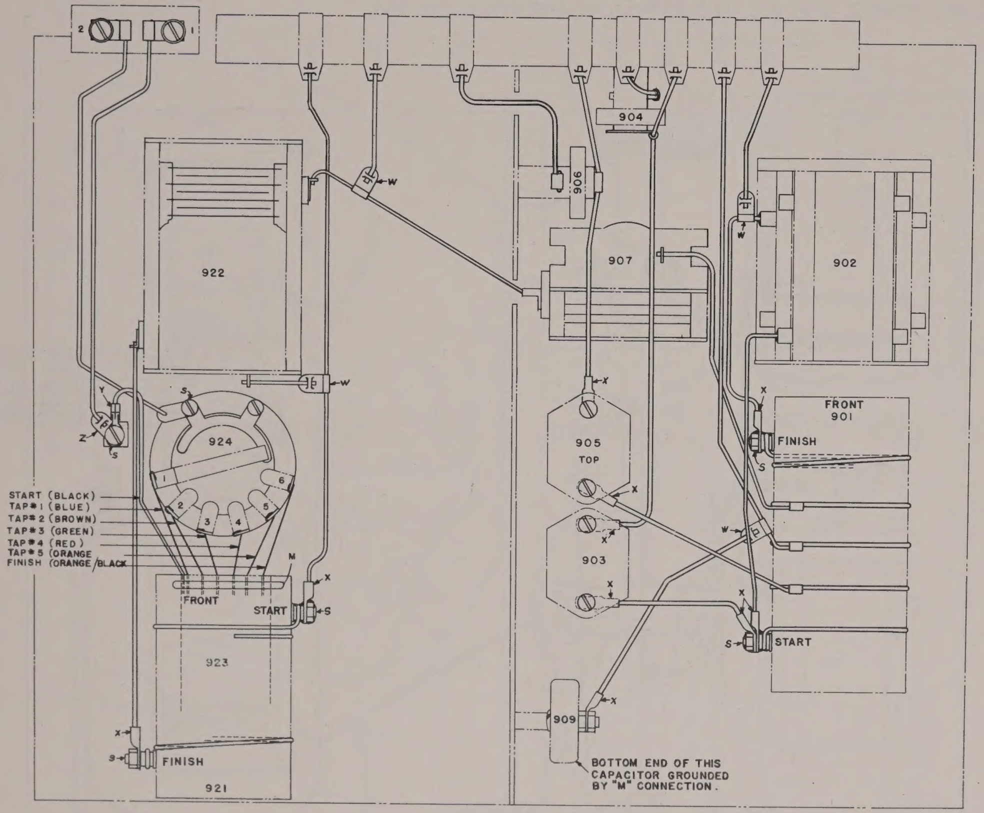
NOTE:
AT POINTS MARKED "X" USE TERM. V-1444451
" " " "Z" " " K-7872305
" " " "Y" " " V-2454945
" " " "W" " " K-7872368
" " " "S" SOLDER COMPLETE JOINT TOGETHER.

NOTE:
THERE SHALL BE NO SHARP POINTS LEFT AFTER UNIT IS WIRED EITHER FROM LUMPS OF SOLDER OR IRREGULARLY CUT WIRE ENDS.
WIRE TO BE FASTENED MECHANICALLY TO TERMINALS BEFORE SOLDERING USE ROSIN CORE SOLDER B20D3B

SYMBOL	NAME OF UNIT	
UNIT#8		
801	M.O. TANK INDUCTANCE	
802	M.O. TANK CAPACITOR	
803	M.O. GRID BLOCKING CAPACITOR	
804	M.O. GRID CHOKE	
805	P.A. GRID BLOCKING CAPACITOR	
806	P.A. GRID CHOKE	
807	NEUTRALIZING CAPACITOR	
821	P.A. TANK INDUCTANCE	
822	P.A. TANK CAPACITOR	
823	ANT. COUPLING COIL	
824	ANT. COUPLING SWITCH	

CONNECTION	SIZE OF CONNECTOR
M	SPECIFIED ON MECHANICAL DRAWING
NOT MARKED	COPPER WIRE TINNED .102 DIA.

FIG. 56. TRANSMITTER TUNING UNIT TU-8-A, CONNECTION DIAGRAM



2
1
904
906
907
902
922
924
905
TOP
903
909
FRONT
901
FINISH
START
S
X
W
Y
Z
M
1
2
3
4
5
6
START (BLACK)
TAP #1 (BLUE)
TAP #2 (BROWN)
TAP #3 (GREEN)
TAP #4 (RED)
TAP #5 (ORANGE
FINISH (ORANGE/BLACK
FRONT
START
923
FINISH
921
BOTTOM END OF THIS CAPACITOR GROUNDED BY "M" CONNECTION.

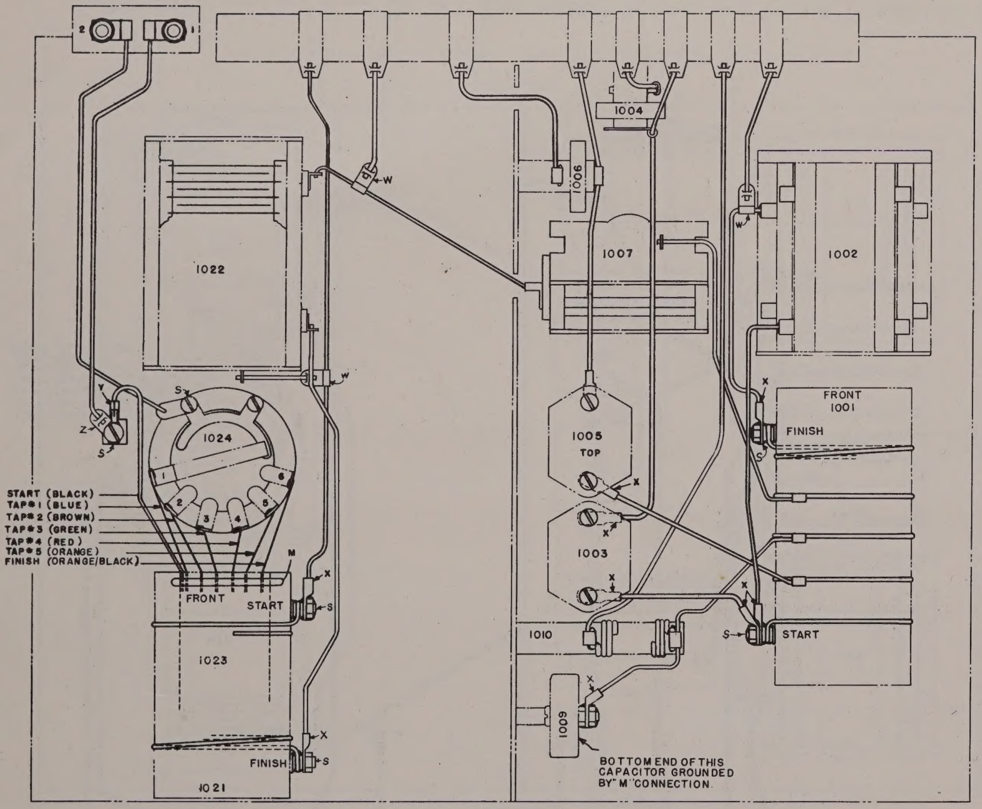
NOTE:
AT POINTS MARKED "X" USE TERM. V-1444451
" " " "Z" " " K-7872305
" " " "Y" " " (V-2454945)
" " " "W" " " K-7872368
" " " "S" SOLDER COMPLETE JOINT TOGETHER.

NOTE:-
THERE SHALL BE NO SHARP POINTS LEFT AFTER UNIT IS WIRED EITHER FROM LUMPS OF SOLDER OR IRREGULARLY CUT WIRE ENDS.
WIRE TO BE FASTENED MECHANICALLY TO TERMINALS BEFORE SOLDERING. USE ROSIN CORE SOLDER B20D3B

SYMBOL	NAME OF UNIT	
UNIT #9		
901	M.O. TANK INDUCTANCE	
902	M.O. TANK CAPACITOR	
903	M.O. GRID BLOCKING CAPACITOR	
904	M.O. GRID CHOKE	
905	P.A. GRID BLOCKING CAPACITOR	
906	P.A. GRID CHOKE	
907	NEUTRALIZING CAPACITOR	
909	M.O. BY PASS CAPACITOR	
921	P.A. TANK INDUCTANCE	
922	P.A. TANK CAPACITOR	
923	ANT. COUPLING COIL	
924	ANT. COUPLING SWITCH	

CONNECTION	SIZE OF CONNECTOR
M	SPECIFIED ON MECHANICAL DRAWING
NOT MARKED	COPPER WIRE TINNED .102 DIA.

FIG. 57. TRANSMITTER TUNING UNIT TU-9-A, CONNECTION DIAGRAM


2
1
W
1022
W
Y
Z
S
S
1024
1
2
3
4
5
6
START (BLACK)
TAP#1 (BLUE)
TAP#2 (BROWN)
TAP#3 (GREEN)
TAP#4 (RED)
TAP#5 (ORANGE)
FINISH (ORANGE/BLACK)
M
X
S
FRONT
START
1023
X
FINISH
S
1021
1004
1006
1007
1005
TOP
X
X
1003
X
1010
1009
X
BOTTOM END OF THIS
CAPACITOR GROUNDED
BY "M" CONNECTION.
1002
W
X
FRONT
1001
FINISH
S
X
S
START

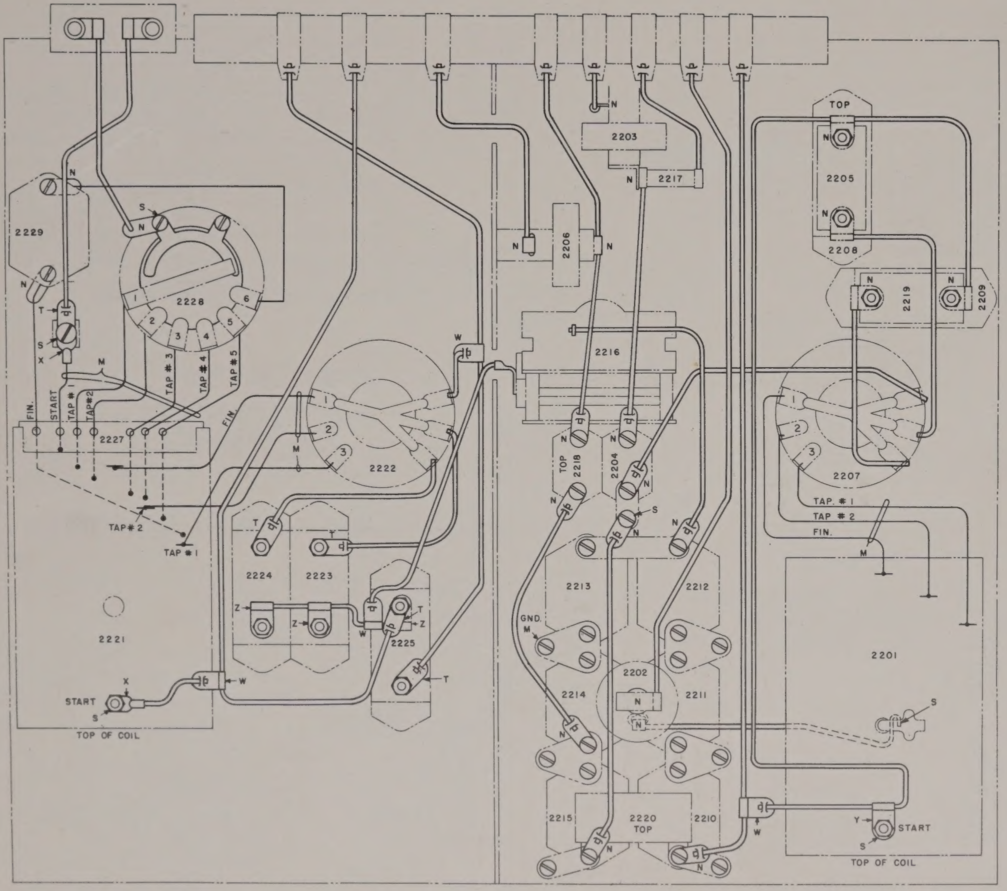
NOTE:
AT POINTS MARKED "X" USE TERM. V-1444451
" " " "Z" " " K-7872305
" " " "Y" " " V-2454945
" " " "W" " " K-7872368
" " " "S" SOLDER COMPLETE JOINT TOGETHER.

NOTE:-
THERE SHALL BE NO SHARP POINTS LEFT AFTER UNIT IS WIRED EITHER FROM LUMPS OF SOLDER OR IRREGULARLY CUT WIRE ENDS.
WIRE TO BE FASTENED MECHANICALLY TO TERMINALS BEFORE SOLDERING USE ROSIN CORE SOLDER B20D3B

SYMBOL	NAME OF UNIT	
UNIT #10		
1001	M.O. TANK INDUCTANCE	
1002	M.O. TANK CAPACITOR	
1003	M.O. GRID BLOCKING CAPACITOR	
1004	M.O. GRID CHOKE	
1005	P.A. GRID BLOCKING CAPACITOR	
1006	P.A. GRID CHOKE	
1007	NEUTRALIZING CAPACITOR	
1009	M.O. BY PASS CONDENSER	
1010	M.O. CHOKE	
1021	P.A. TANK INDUCTANCE	
1022	P.A. TANK CAPACITOR	
1023	ANT. COUPLING COIL	
1024	ANT. COUPLING SWITCH	

CONNECTION	SIZE OF CONNECTOR
M	SPECIFIED ON MECHANICAL DRAWING
NOT MARKED	COPPER WIRE TINNED .102 DIA.

FIG. 58. TRANSMITTER TUNING UNIT TU-10-A, CONNECTION DIAGRAM


2201
2202
2203
2204
2205
2206
2207
2208
2209
2210
2211
2212
2213
2214
2215
2216
2217
2218
2219
2220
TOP
2221
2222
2223
2224
2225
2227
2228
2229
TOP
TAP. # 1
TAP # 2
FIN.
START
TOP OF COIL
TAP # 1
TAP # 2
TAP # 3
TAP # 4
TAP # 5
FIN.
START
TOP OF COIL
GND.
N
S
M
T
W
X
Y
Z

NOTE FOR SOLDERING:-

WIRE TO BE FASTENED MECHANICALLY TO TERMINALS BEFORE SOLDERING. USE ROSIN CORE SOLDER B20D3C.

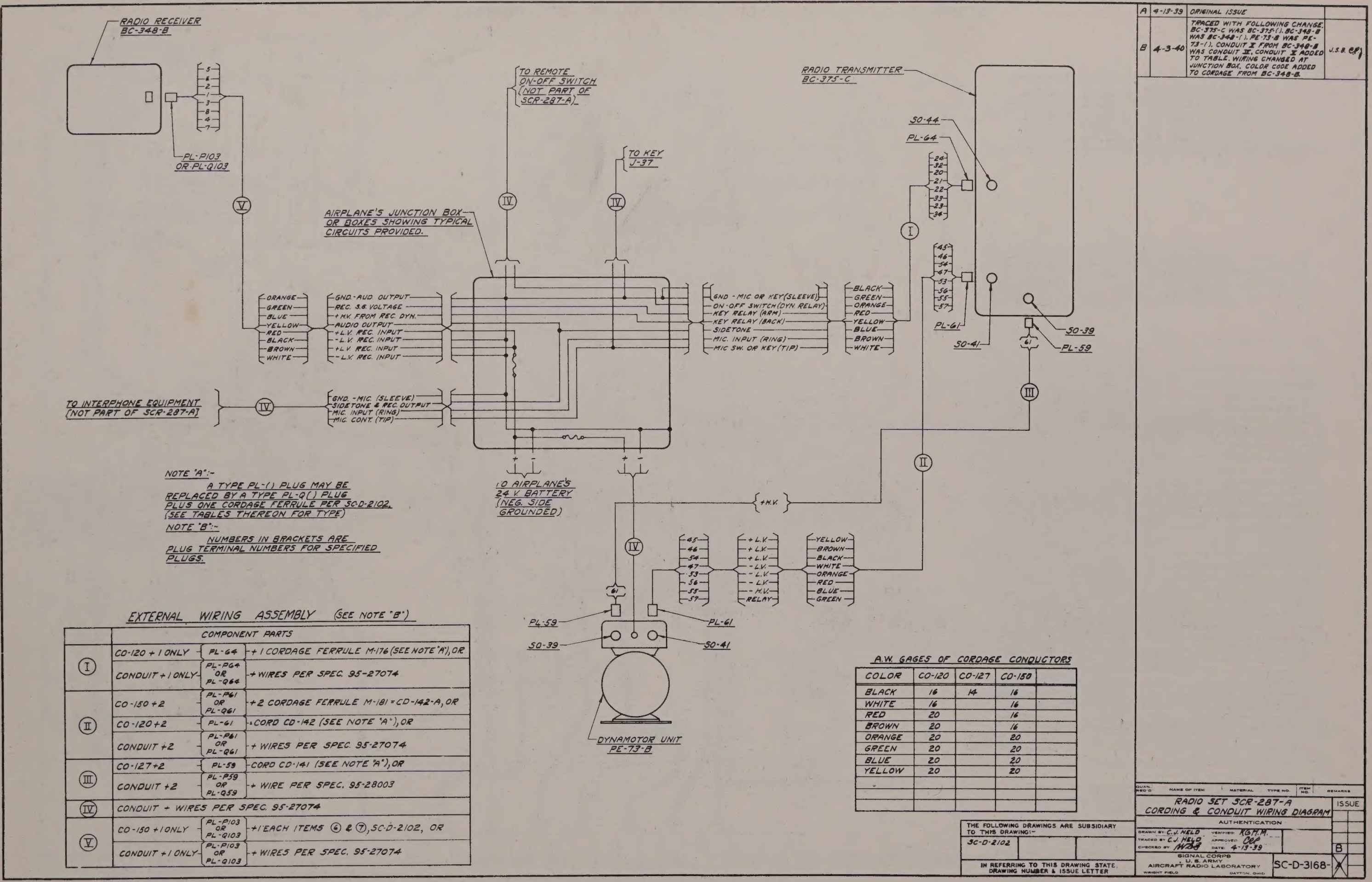
THERE SHALL BE NO SHARP POINTS LEFT AFTER UNIT IS WIRED EITHER FROM LUMPS OF SOLDER OR IRREGULARLY CUT WIRE ENDS.

SYMBOL	NAME OF PART	
2201	M.O. TANK INDUCTANCE	
2202	M.O. PLATE CHOKE	
2203	M.O. GRID CHOKE	
2204	M.O. GRID BLOCKING CAPACITOR	
2205	M.O. TANK COMPENSATING CAP.	
2206	P.A. GRID CHOKE	
2207	M.O. BAND CHANGE SWITCH	
2208	M.O. FIXED TANK CAPACITOR	
2209	M.O. FIXED TANK CAPACITOR	
2210	M.O. CHAIN CAPACITOR	
2211	M.O. CHAIN CAPACITOR	
2212	M.O. CHAIN CAPACITOR	
2213	M.O. CHAIN CAPACITOR	
2214	M.O. CHAIN CAPACITOR	
2215	M.O. CHAIN CAPACITOR	
2216	NEUTRALIZING CAPACITOR	
2217	M.O. GRID PARASITIC RESISTOR	
2218	P.A. GRID BLOCKING CAPACITOR	
2219	M.O. TANK COMPENSATING CAP.	
2220	M.O. TANK COMPENSATING CAP.	
2221	P.A. TANK INDUCTANCE	
2222	P.A. BAND CHANGE SWITCH	
2223	P.A. FIXED TANK CAPACITOR	
2224	P.A. FIXED TANK CAPACITOR	
2225	P.A. FIXED TANK CAPACITOR	
2227	ANT. COUPLING COIL	
2228	ANT. COUPLING SWITCH	
2229	ANT. COUPLING CAPACITOR	

CONNECTOR	DESCRIPTION
M	UNIT PIECE OF APPARATUS
NOT MARKED	.102" DIA. COPPER WIRE TINNED

NOTE:- AT POINTS MARKED "S" SOLDER COMPLETE JOINT TOGETHER.
AT POINTS MARKED "T" USE TERM. K-7872305.
AT POINTS MARKED "W" USE TERM. K-7872368.
AT POINTS MARKED "X" USE TERM. V-1444451.
AT POINTS MARKED "Z" USE TERM. K-7870226.
AT POINTS MARKED "N" TERMINALS CALLED FOR ON MECHANICAL DRAWING.
AT POINTS MARKED "Y" USE TERM. V-1451309.

FIG. 59. TRANSMITTER TUNING UNIT TU-22-A, CONNECTION DIAGRAM


RADIO RECEIVER BC-348-B
5
6
2
1
3
8
4
7
PL-P103 OR PL-Q103
Ⅴ
TO REMOTE ON-OFF SWITCH (NOT PART OF SCR-287-A)
Ⅳ
TO KEY J-37
Ⅳ
AIRPLANE'S JUNCTION BOX OR BOXES SHOWING TYPICAL CIRCUITS PROVIDED.
ORANGE
GREEN
BLUE
YELLOW
RED
BLACK
BROWN
WHITE
GND.-AUD OUTPUT
REC. 3.6 VOLTAGE
+H.V. FROM REC. DYN.
AUDIO OUTPUT
+L.V. REC. INPUT
-L.V. REC. INPUT
+L.V. REC. INPUT
-L.V. REC. INPUT
TO INTERPHONE EQUIPMENT (NOT PART OF SCR-287-A)
Ⅳ
GND. -MIC. (SLEEVE)
SIDETONE & REC. OUTPUT
MIC. INPUT (RING)
MIC. CONT. (TIP)
+
-
+
-
TO AIRPLANE'S 24 V. BATTERY (NEG. SIDE GROUNDED)
GND -MIC OR KEY(SLEEVE)
ON-OFF SWITCH(DYN. RELAY)
KEY RELAY (ARM)
KEY RELAY (BACK)
SIDETONE
MIC. INPUT (RING)
MIC SW. OR KEY (TIP)
BLACK
GREEN
ORANGE
RED
YELLOW
BLUE
BROWN
WHITE
RADIO TRANSMITTER BC-375-C
SO-44
PL-64
24
32
20
21
22
33
23
34
Ⅰ
45
46
54
47
53
56
55
57
PL-61
SO-41
SO-39
PL-59
61
Ⅲ
Ⅱ
+H.V.
Ⅳ
45
46
54
47
53
56
55
57
+L.V.
+L.V.
+L.V.
-L.V.
-L.V.
-L.V.
-H.V.
RELAY
YELLOW
BROWN
BLACK
WHITE
ORANGE
RED
BLUE
GREEN
61
PL-59
SO-39
PL-61
SO-41
DYNAMOTOR UNIT PE-73-B

A	4-13-39	ORIGINAL ISSUE
B	4-3-40	TRACED WITH FOLLOWING CHANGE. BC-375-C WAS BC-375-( ). BC-348-B WAS BC-348-( ). PE-73-B WAS PE-73-( ). CONDUIT Ⅰ FROM BC-348-B WAS CONDUIT Ⅱ. CONDUIT Ⅴ ADDED TO TABLE. WIRING CHANGED AT JUNCTION BOX. COLOR CODE ADDED TO CORDAGE FROM BC-348-B.

J.S.B. C.P.J.

NOTE "A":-
A TYPE PL-( ) PLUG MAY BE REPLACED BY A TYPE PL-Q( ) PLUG PLUS ONE CORDAGE FERRULE PER SC-D-2102. (SEE TABLES THEREON FOR TYPE)

NOTE "B":-
NUMBERS IN BRACKETS ARE PLUG TERMINAL NUMBERS FOR SPECIFIED PLUGS.

EXTERNAL WIRING ASSEMBLY (SEE NOTE "B")

	COMPONENT PARTS		
Ⅰ	CO-120 + 1 ONLY	PL-64	+ 1 CORDAGE FERRULE M-176 (SEE NOTE "A"), OR
	CONDUIT + 1 ONLY	PL-P64 OR PL-Q64	+ WIRES PER SPEC. 95-27074
Ⅱ	CO-150 + 2	PL-P61 OR PL-Q61	+ 2 CORDAGE FERRULE M-181 = CD-142-A, OR
	CO-120 + 2	PL-61	+ CORD CD-142 (SEE NOTE "A"), OR
	CONDUIT + 2	PL-P61 OR PL-Q61	+ WIRES PER SPEC. 95-27074
Ⅲ	CO-127 + 2	PL-59	CORD CD-141 (SEE NOTE "A"), OR
	CONDUIT + 2	PL-P59 OR PL-Q59	+ WIRE PER SPEC. 95-28003
Ⅳ	CONDUIT + WIRES PER SPEC. 95-27074		
Ⅴ	CO-150 + 1 ONLY	PL-P103 OR PL-Q103	+ 1 EACH ITEMS ⑥ & ⑦, SC-D-2102, OR
	CONDUIT + 1 ONLY	PL-P103 OR PL-Q103	+ WIRES PER SPEC. 95-27074

A.W. GAGES OF CORDAGE CONDUCTORS

COLOR	CO-120	CO-127	CO-150	
BLACK	16	14	16	
WHITE	16		16	
RED	20		16	
BROWN	20		16	
ORANGE	20		20	
GREEN	20		20	
BLUE	20		20	
YELLOW	20		20	

THE FOLLOWING DRAWINGS ARE SUBSIDIARY TO THIS DRAWING:-
SC-D-2102

IN REFERRING TO THIS DRAWING STATE DRAWING NUMBER & ISSUE LETTER

QUAN. REQ'D	NAME OF ITEM	MATERIAL	TYPE NO.	ITEM NO.	REMARKS

RADIO SET SCR-287-A
CORDING & CONDUIT WIRING DIAGRAM

AUTHENTICATION

DRAWN BY: C.J. HELD
TRACED BY: C.J. HELD
CHECKED BY: WDB
VERIFIED: KGH.M.
APPROVED: CRP
DATE: 4-13-39

SIGNAL CORPS
U. S. ARMY
AIRCRAFT RADIO LABORATORY
WRIGHT FIELD DAYTON, OHIO

SC-D-3168-~~A~~ B

ISSUE

FIG. 60. RADIO SET SCR-287-A, CORDING DIAGRAM